

Master Maths 10 Worksheet 1

Numbers

1

Name: _____

DO NOT USE A CALCULATOR

1. Match the following symbols with the number sets listed below.

W I Q R N Z

- The set of real numbers
- The set of integers
- The set of whole numbers
- The set of irrational numbers
- The set of natural numbers
- The set of rational numbers

2. State if the following statements are true(T) or false(F).

- (a) $7 \in I$ (b) $-8 \in N$ (c) $\frac{7}{5} \in Q$
- (d) $\sqrt{5} \in R$ (e) $6.7 \in Z$ (f) $-2 \in Q$
- (g) $0 \in W$ (h) $5.2 \in N$ (i) $\frac{6}{7} \in I$

3. Choose **all** the numbers from the following group that would make the statements below correct.

7, -8, 3.4, -1.9, $\sqrt{6}$, $\frac{9}{5}$, π , 0

- (a) { } $\subset N$
- (b) { } $\subset W$
- (c) { } $\subset I$
- (d) { } $\subset Q$
- (e) { } $\subset R$
- (f) { } $\subset Z$

4. Add 1000 to the following numbers.

- (a) 56 782 (b) 239 108 (c) 1 999 610

5. Subtract 100 to the following numbers.

- (a) 8765 (b) 30 061 (c) 410 073

6. Round the following numbers to the nearest 100.

- (a) 7671 (b) 29 959 (c) 523 949

7. Solve the following problems. Remember BODMAS

- (a) $8 \times 3 - 16 \div 8$ (b) $5 \times (4 + 8) \div 2 \times 3$

- (c) $\frac{1}{2}$ of $(8 + 6) + 2 \times (3 + 5 - 2 + 6) - 5 \times 4$

8. Write 7056 as a product of its prime factors in index form.

9. Complete the following table showing conversions between numbers and roman numerals.

Number	Roman Numeral
157	
2743	
2938	
	CCXCII
	MDCIX
	MMCMLXXIV

Master Maths 10 Worksheet 2

Fractions

2

Name: _____

1. Write the following fractions in their simplest form.

(a) $\frac{24}{56}$ (b) $\frac{18}{33}$ (c) $\frac{28}{63}$ (d) $\frac{72}{96}$

2. Complete the following equivalent fractions.

$$\frac{3}{4} = \frac{9}{\square} = \frac{\square}{20} = \frac{42}{\square} = \frac{\square}{72}$$

3. Change the following fractions to have the same denominator.

$\frac{3}{4}$ $\frac{7}{12}$ $\frac{5}{8}$

4. Write the first quantity as a fraction of the second and write in its simplest form.

(a) 50 cm : 3 m (b) 60c : \$4.50

5. Change $3\frac{5}{9}$ to an improper fraction.

6. Change $\frac{43}{6}$ to a mixed number.

7. Find the following amounts.

(a) $\frac{5}{6}$ of 24 m (b) $\frac{3}{4}$ of 456 kg (c) $\frac{5}{8}$ of \$640

8. Fran won \$75 000. She gave one third to her mother, one fifth to her sister and kept the rest.

(a) What fraction of her winnings did Fran keep?

(b) How much did Fran keep?

9. Solve the following problems.

Write answers as mixed numbers in their simplest form.

(a) $\frac{3}{11} + \frac{5}{11}$ (b) $\frac{1}{5} + \frac{3}{10}$ (c) $\frac{11}{12} - \frac{1}{3}$

(d) $\frac{3}{7} + \frac{3}{8}$ (e) $\frac{8}{9} - \frac{2}{5}$ (f) $\frac{2}{5} + \frac{3}{4} - \frac{2}{3}$

(g) $2\frac{3}{4} + 3\frac{4}{5}$ (h) $5\frac{3}{8} - 2\frac{7}{12}$

(i) $\frac{3}{5} \times \frac{4}{7}$ (j) $\frac{8}{9} \times \frac{3}{10}$ (k) $\frac{3}{13}$ of 2

(l) $\frac{9}{14} \div \frac{3}{7}$ (m) $\frac{8}{15} \div \frac{4}{45}$ (n) $\frac{10}{13} \div 5$

(o) $1\frac{11}{16} \div 4\frac{1}{2}$

Master Maths 10 Worksheet 3

Fractions - Problem Solving

3

Name: _____

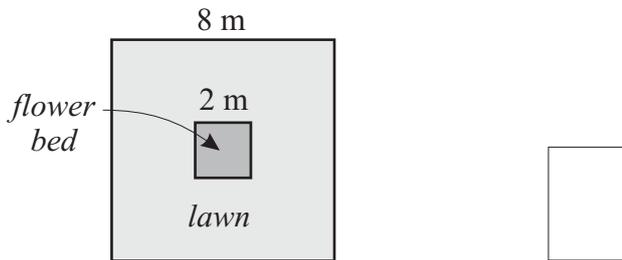
Give all fraction answers as mixed numbers in their simplest form.

1. (a) What fraction of the alphabet is vowels?

(b) How many pieces of wood each one third of a metre long could be cut from a 4 m length of timber?

(c) How many thirds are in a quarter?

2. An 8 m square garden consists of a 2 m square flower bed surrounded by lawn. What fraction of the garden is lawn?



3. 800 mL of water was poured into an empty container making it two-fifths full. What is the capacity of the container?

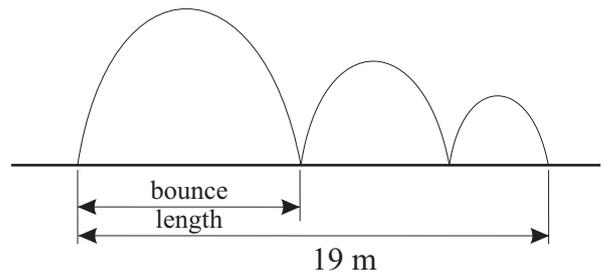
4. Jay, Fay, Kay and Ray painted a house. Jay did one quarter of the work, Fay did one third and Kay did one fifth. Ray was paid \$520. What should the others get paid?

Jay	
Fay	
Kay	

5. Maddy was using bricks to pave a driveway. He took $4\frac{1}{2}$ hours to lay 360 bricks and had laid three-eighths of the driveway.
 (a) How many more bricks would he need to complete paving the driveway?

(b) How much longer will it take him?

6. A ball was thrown and bounced as shown below.



The length of each bounce was two thirds of the previous bounce.
 The total distance of the three bounces was 19 m.
 Calculate the length of the first bounce.

7. Use a calculator to solve this problem

$$\frac{6\frac{2}{5} \times (2\frac{3}{4} + 3\frac{5}{6})}{7\frac{2}{7} - 4\frac{1}{3}}$$

Master Maths 10 Worksheet 4

Decimal Numbers

4

Name: _____

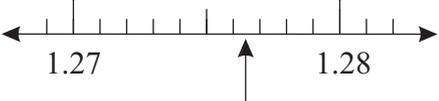
- 1.** Find the following decimal number.
- It is between 5 and 6.
 - It has two thousandths and three tenths.
 - The sum of the digits is 10.
-

- 2.** Find the number mid way between 3.45 and 3.78
-

- 3.** Add thirty-six thousandths to 7.8972
-

- 4.** Write the following as a decimal number:
Fifty-eight ten-thousandths
-

- 5.** Write in words: 0.49
- _____

- 6.** State the number indicated on the following scale.
- 
-

- 7.** Convert the following fractions to decimal numbers.
- (a) $\frac{5}{1000}$ (b) $\frac{387}{10\ 000}$ (c) $7\frac{61}{1000}$
-
-
-

- 8.** Convert the following decimal numbers to fractions.
- (a) 0.047 (b) 6.1093 (c) 32.00801
-
-
-

- 9.** Convert these fractions to decimal numbers.
- (a) $\frac{7}{8}$ (b) $\frac{13}{20}$
-
-

- 10.** Convert the following fractions to decimal numbers clearly showing the digits that are recurring.

- (a) $\frac{7}{9}$ (b) $\frac{7}{12}$ (c) $\frac{6}{7}$
-
-
-

- 11.** Convert the following decimal numbers to to fractions.
- (a) $0.\dot{5}$ (b) $0.2\bar{13}$

-
-

- 12.** Round the following numbers to the nearest hundredth.
- (a) 0.2748 (b) 6.0967 (c) 29.7058
-
-
-

- 13.** Round the following numbers to three decimal places.
- (a) 0.2748 (b) 6.09649 (c) 29.79961
-
-
-

- 14.** Write the following in scientific notation.
- (a) 784 000 000 000
- (b) 0.000 000 023 8

- 15.** What fraction is 4.2 m of 5.8 m? Write answer in its simplest form.
-

Master Maths 10 Worksheet 5
Decimal Numbers - Problem Solving

5

Name: _____

1. A dam holds 1.876 ML of water. The farmer uses 0.7035 ML to irrigate his farm. What fraction of the dam's water did he use? Write fraction in its simplest form.

2. To make a certain chemical, 1.356 L of nitric acid was added to 3.024 L of benzene. The mixture was poured equally into 15 vials. There was 0.405 L of the mixture remaining. What was the volume of mixture in each vial?

3. An electric generator is rotating at the rate of 2400 revolutions per minute (rpm).

(a) How many revolutions occur every second?

(b) What is the time of one revolution? Give answer in seconds correct to three decimal places.

(c) The time of each revolution is changed to 0.01875 seconds. How many revolutions occur each minute (rpm)?

4. Hilde swam the 100 m freestyle at the State championships in a time of 58.69 seconds. This was 0.43 seconds faster than the previous record. Olive came second in the race, 0.78 seconds behind Hilde.

(a) What was the previous record time?

(b) What time did Olive swim?

5. Willie Wheels clocked a time of 47.352 sec in the first lap of a motor cycle race. Max Mono, in his first lap, had a time of 47.329 sec.

(a) Which rider had the fastest time?

(b) What was the difference between their lap times?

(c) Willie's second lap was three thousandths of a second faster than his first. What was the time for his second lap?

(d) Max's second lap was nine hundredths of a second slower than his first. What was Max's second lap time?

6. A truck has a load of 60 bags of oats and 80 bags of wheat. The total (gross) weight of the truck and load is 7.1 tonnes. At its first delivery point, 20 bags of oats and 30 bags of wheat are unloaded. The gross weight was then 5.8 tonnes. At its next stop, 20 bags of oats and 40 bags of wheat were unloaded. Its gross weight was then 4.2 tonnes.

(a) Find the weight (in kg) of a bag of wheat.

(b) Find the weight (in kg) of a bag of oats.

Master Maths 10 Worksheet 6

Integers

6

Name: _____

1. Complete this multiplication table.

×	-2	-3	-6	-10	-12	-7
	-2					
		-27				
			-24			
				80		
					60	
						77

2. Complete this addition table.

+	-10		-12		6	
	-5					
-9		-5				
			-5			
-3				-5		
					-5	
3						-5

3. Find the following.

- | | |
|---|---|
| (a) 6 more than 3 | (b) 6 less than 3 |
| <input style="width: 50px; height: 20px;" type="text"/> | <input style="width: 50px; height: 20px;" type="text"/> |
| (c) 2 more than -8 | (d) 5 less than -5 |
| <input style="width: 50px; height: 20px;" type="text"/> | <input style="width: 50px; height: 20px;" type="text"/> |
| (e) 8 more than -3 | (f) 8 more than -23 |
| <input style="width: 50px; height: 20px;" type="text"/> | <input style="width: 50px; height: 20px;" type="text"/> |

4. Solve the following problems given that:

$a = 5 \quad b = -4 \quad c = -6$

- (a) ab (b) $b - a$ (c) $2a - 5c$

- (d) $5abc$ (e) $\frac{2a - 5b}{c}$ (f) $\frac{7c - 3b}{2a}$

5. A naval patrol boat was patrolling a north-south coastline. It left base and travelled north 58 km. It then turned around and travelled south 146 km. It then travelled north 172 km and then south 98 km. How far, and in what direction, is the patrol boat from its base?

6. The sum of three numbers, **A**, **B** and **C**, is -2.

B = 2A

C = B + 18

Find **A**, **B** and **C**.

A

B

C

Master Maths 10 Worksheet 7

Percentages 1

7

Name: _____

1. An oil blend consisted of three different oils: olive (28.3%), safflower (54.4%) and canola. What percentage of the oil blend is canola?

2. Complete the following conversion table.

Percentage	Fraction	Decimal
50%	$\frac{1}{2}$	0.5
30%		
	$\frac{3}{5}$	
		0.07
38.4%		
	$\frac{5}{16}$	
		0.255

3. Write the first quantity as a percentage of the second.

(a) 4 kg, 20 kg (b) 18 min, 1 hour

(c) 15 mm, 8 cm (d) 2.4 tonnes, 800 kg

4. At a football match there were 25 784 spectators. 2496 were standing. What percentage of the spectators were standing? Give answer correct to one decimal place.

5. The population of a town was 7642. In ten years it grew to 8231. What was the percentage growth of the town? Give answer correct to one decimal place.

6. Find the following quantities.

(a) 20% of 58 kg (b) 8.5% of \$54 600

7. The owner of a clothes store in one year makes a profit of \$44 000. She hopes to increase her profit by 10% each year for the next two years. What profit is she expecting in the second year?

8. Find the selling price of a \$450 dress after it has been discounted by 20%.

9. In one year an iceberg melts to 90% of its original size. In the next year it melts to 80% of its reduced size. What percentage is it now of its original size?

10. A fish tank is being filled. 160 litres has been added and the tank is 20% full. What is the capacity of the fish tank?

Name: _____

1. Use the following abbreviations to write the formula that can be used to calculate simple interest.

SI = simple interest
 P = principal (original amount)
 R = interest rate
 T = term

$SI =$

2. Calculate the amount of simple interest that would be earned if \$8000 is invested at an annual interest rate of 8.5% for 5 years.

3. \$6000 is borrowed for 3 years at an annual simple interest rate of 7.25%.
Find the total amount of money that needs to be repaid.

4. Use the following abbreviations to write the formula that can be used to calculate compound interest.

A = amount investment is worth at the end of the time period
 P = the principal invested
 R = the percentage interest rate
 T = the time period

$A =$

5. \$8000 is invested for 5 years earning compound interest of 7.4% p.a. compounded **annually**. Find the value of the investment after the 5 years.

6. \$15 000 is invested for 3 years earning compound interest of 8.64% p.a. compounded **monthly**. Find the value of the investment after the 3 years.

7. \$800 is owed on a credit card that has an annual interest rate of 18.5% that is compounded **daily**. Calculate the the interest accumulated in 30 days.

8. Pete estimated the dimensions of a rectangular block of land to be 45 m \times 65 m. The block was measured to be 48.5 m \times 72.5 m. Find the percentage error of the actual area and the area using Pete's estimates. Give answer correct to one decimal place.

Name: _____

1. Using the symbols for average speed (s), distance (d) and time (t) complete these formulae.

$s =$	$d =$	$t =$
-------	-------	-------

2. Find the average speed of a sprinter who ran 120 metres in 15.8 seconds.
Give answer in m/sec correct to one decimal place.

3. Find the average speed of a marathon runner who ran a marathon (42 km) in 2 hours 25 minutes and 27 seconds.
Give answer in m/sec correct to one decimal place.

4. Find the distance travelled by a lion running at an average speed of 12.5 m/s for 25 seconds.

5. Find the distance travelled by a yacht sailing at an average speed of 15 km/hr for 22 minutes.
Give answer in km.

6. How long will it take a cyclist travelling at 25 km/hr to cycle 800 m?
Give answer in seconds.

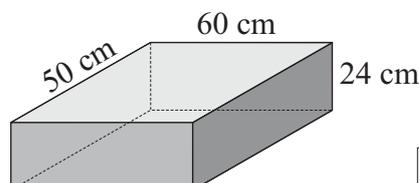
7. Ki's car has a fuel consumption of 8 L per 100 km.
(a) How many litres will her car use travelling 350 km?

- (b) Ki used 42 litres on a trip. How far did she travel?

8. How many grams of salt are in 20 litres of salt/water solution that has a salt concentration of 60 g/L?

9. 50 litres of salt/water solution with salt concentration 40 g/L is added to 100 litres of salt/water solution with salt concentration of 10 g/L.
What is the salt concentration of the final solution?

10. The density of a hardwood was 850 kg/m³.
What would be the mass of the block of this wood shown below?



Name: _____

1. (a) Divide \$90 in the ratio of 4:5.

--	--

- (b) Divide 120 kg in the ratio 4:1.

--	--

- (c) Divide \$810 in the ratio 2:3:4.

--	--	--

- (d) Divide 1.2 m in the ratio 3:2.

--	--

2. Fran and Denise divided their payment for cleaning a house in the ratio 3:5.

- (a) What fraction of the payment did Fran receive?

--

- (b) What percentage of the payment did Denise receive?

--

- (c) If the total payment was \$120 how much did they each receive?

Fran	
Denise	

3. Two fifths of the audience at a concert were males. What is the ratio of males to females at the concert?

--

4. Write the following ratios in their simplest form.

- (a) \$56:\$60 (b) 48 m:72 m (c) 1.8 g:3.2 g

--	--	--

5. 1.2 litres of green paint is mixed with 1.6 litres of yellow paint. What is the ratio (in its simplest form) of green paint to yellow paint?

--

6. Joe mixed 80 g of wheat and 60 g of oats to make a feed mix for his chooks.

- (a) What is the ratio (in its simplest form) of wheat to oats?

--

- (b) Joe had 360 g of wheat. How many grams of oats should he add to make a feed mix with the same ratio?

--

- (c) If Joe wanted to make 3.5 kg of the mix how many grams of each grain should he use?

wheat	
oats	

7. Gerry made a snack mix using one cup of sultanas, one quarter of a cup of sunflower seeds, one eighth of a cup of peanuts and half a cup of cashews. How many grams of each ingredient should he use to make 1.5 kg of the mix?

sultanas	
sunflower seeds	
peanuts	
cashews	

8. Esther mixed 120 mL of oil and 2.5 L of petrol for her lawnmower fuel. She then realised the oil/petrol ratio should be 1:25. How many mL of petrol should she add to make the correct ratio?

--

Master Maths 10 Worksheet 11

Surds

11

Name: _____

1. Circle the irrational numbers in the list below.

$0.\dot{7}$ $\sqrt{16}$ $\sqrt{15}$ $0.3\overline{57}$ π $\frac{6}{7}$

2. Simplify the following surds.

(a) $\sqrt{25}$ (b) $\sqrt{49}$ (c) $\sqrt{121}$ (d) $\sqrt{81}$

3. Simplify the following surds.

(a) $\sqrt{28}$ (b) $\sqrt{99}$ (c) $3\sqrt{32}$ (d) $5\sqrt{162}$

4. Write the following as entire surds.

(a) $8\sqrt{2}$ (b) $5\sqrt{9}$ (c) $6\sqrt{5}$ (d) $3\sqrt{13}$

5. Simplify the following expressions.

(a) $8\sqrt{2} + 5\sqrt{2}$ (b) $5\sqrt{7} + 6\sqrt{3} - 3\sqrt{7} + 5\sqrt{3}$

(c) $5\sqrt{48} - 8\sqrt{12}$ (d) $\sqrt{20} - 2\sqrt{45} + 3\sqrt{500}$

(e) $2\sqrt{6} \times 3\sqrt{10}$ (f) $\frac{5\sqrt{24}}{2\sqrt{75}}$

6. Expand and simplify.

(a) $\sqrt{5}(\sqrt{2} + \sqrt{10})$ (b) $3\sqrt{2}(6\sqrt{6} + 2\sqrt{8})$

7. Expand and simplify.

$(5\sqrt{3} + 2\sqrt{7})(3\sqrt{7} + 2\sqrt{3})$

8. Write the following fractions with rational denominators and simplify where possible.

(a) $\frac{3}{\sqrt{5}}$ (b) $\frac{2\sqrt{7}}{3\sqrt{5}}$ (c) $\frac{3 + 4\sqrt{11}}{2\sqrt{5}}$

(d) $\frac{2\sqrt{5} - 3\sqrt{3}}{4\sqrt{5} + 2\sqrt{3}}$

Master Maths 10 Worksheet 12

Algebraic Symbols

12

Name: _____

1. Write the following statements as algebraic expressions.

- | | |
|--------------------------------------|--|
| (a) The sum of A and B | |
| (b) The product of m and n | |
| (c) 6 times the sum of p and q | |
| (d) The product of x and $(y - z)$ | |

2. State the coefficient of the following terms.

- | | | |
|------------|------------------------|----------|
| (a) $5x^2$ | (b) $-\frac{2}{3}bc^4$ | (c) $-A$ |
| | | |

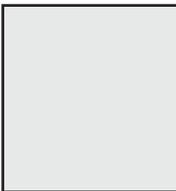
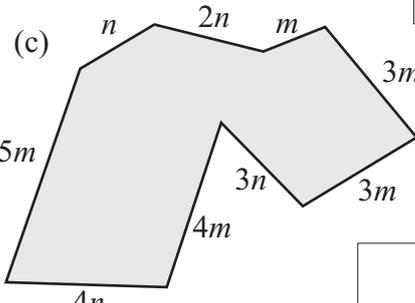
3. Simplify the following expressions.

- | | | |
|---|--------------------------|----------------|
| (a) $7m - 2m$ | (b) $6x + 5x$ | (c) $5n - n$ |
| | | |
| (d) $3y - 7y$ | (e) $-4p - 9p$ | (f) $-5c + 8c$ |
| | | |
| (g) $7a + 5a - 4a - 2a$ | (h) $5d - 8d - d + 6d$ | |
| | | |
| (i) $5m + 2n - 7m + 2n$ | (j) $-4x + 7y - 5y + 8x$ | |
| | | |
| (k) $6a + 4c - 8b + 7c - a + b + 9a + 3b - 11c$ | | |
| | | |
| (l) $2x^2y + 4xy^2 - 6xy + 3xy^2 - 5x^2y - 3xy$ | | |
| | | |
| (m) $5p^2 + 6p - 4q + 3q^2 + 3p - 7q + 4p^2 - 8q^2$ | | |
| | | |

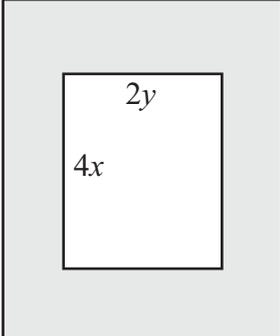
4. Simplify the following expressions.

- | | |
|---------------------------------|--|
| (a) $6x \times 4y$ | (b) $5q \times r \times 2p \times 2p$ |
| | |
| (c) $3ab \times 2bc \times 4ac$ | (d) $4z \times 2x \times 3z \times y \times x$ |
| | |

5. Find the *perimeter* of the following shapes.

- | | |
|--|--|
| (a) 
Perimeter: | (b) 
Perimeter: |
| (c) 
Perimeter: | |

6. Find the *area* of the shaded regions below.

- | | |
|---|--|
| (a) 
Area: | |
| (b) 
Area: | |

Name: _____

1. Expand the following algebraic expressions.

(a) $5(x + 3)$

(b) $4(2a - 3b)$

(c) $-2(5m - 4n)$

(d) $6(2a - 3b + 5c)$

(e) $m(2m + 3n)$

(f) $-2a(3a - 5b)$

2. Expand and simplify the following algebraic expressions.

(a) $4(x + 3) + 2(x + 5)$

(b) $3(m - 5) - 4(m + 2)$

(c) $5(x + 3y) + 4(3x - 2y)$

(d) $-2a(3a + 4b) - 3a(4a - 5b)$

(e) $(a + 2)(a + 5)$

(f) $(x - 4)(x - 6)$

(g) $(m - 5)(m + 12)$

(h) $(2n + 3)(3n - 8)$

(i) $(3a - 4b)(2a - 5b)$

(j) $(6m + 7n)(2m - 9n)$

Master Maths 10 Worksheet 14
Expanding Algebraic Expressions 2

14

Name: _____

Expand and simplify the following expressions.

1. $(2b - 3c)^2$

2. $4(3a - b)(2a + 7b)$

3. $2x(3x - 2y)^2$

4. $(2x + 3)(3x^2 - 4x + 2)$

5. $(2y^2 - y + 5)(5y - 7)$

6. $(2p + 3)(3p - 5)(2p - 1)$

7. $(2n - 3)(3n + 5)^2$

8. $(3a - 2)^3$

9. $(4x - 3y)^3$

Master Maths 10 Worksheet 15
Factorisation 1

15

Name: _____

1. Factorise the following expressions by finding the highest common factor.

(a) $6m - 21$

(b) $15a + 5$

--	--

(c) $-6x - 9y$

(d) $-4a + 10b - 16c$

--	--

(e) $6x^2 + 14x$

(f) $8xy - 12yz$

--	--

(g) $18m^2n + 24mn^2$

(h) $-36xy^2 - 18y^2$

--	--

2. Factorise the following expressions.

(a) $6(x - 4) + y(x - 4)$

--

(b) $a(p + q) - b(p + q)$

--

(c) $4y - 20 + xy - 5x$

--

(d) $4a + 6b + ab + 24$

--

(e) $3m - 2pn + 6n - mp$

--

3. Factorise the following expressions

(a) $a^2 - b^2$

(b) $25 - h^2$

--	--

(c) $m^2 - 1$

(d) $16x^2 - y^2$

--	--

(e) $m^2 - 15$

(f) $4t^2 - 39$

--	--

(g) $49n^2 - 100p^2$

--

(h) $50a^2 - 32b^2$

--

4. Factorise and simplify the following expressions.

(a) $(x + 2)^2 - (x - 3)^2$

--

(b) $4(y - 5)^2 - 9(y + 6)^2$

--

Name: _____

1. Factorise the following quadratic trinomials.

(a) $x^2 + 9x + 14$

(b) $m^2 - 13m + 36$

(c) $n^2 + 5n - 24$

(d) $y^2 - y - 110$

(e) $x^2 - 17x - 60$

(f) $2x^2 + 13x + 21$

(g) $4n^2 + 17n - 15$

(h) $15x^2 - 2x - 24$

2. Factorise the following quadratic trinomials by completing the square.

(a) $x^2 + 10x + 6$

(b) $n^2 - 24n - 13$

(c) $x^2 + 10x - 119$

Master Maths 10 Worksheet 17

Algebraic Fractions

17

Name: _____

1. Simplify the following fractions.

(a) $\frac{18x}{16}$ (b) $\frac{8a}{24}$ (c) $\frac{9n^2}{30n}$ (d) $\frac{6x}{36x^2}$

2. Simplify the following algebraic fractions by first factorising the numerator and/or denominator and then cancelling.

(a) $\frac{6n-9}{12}$ (b) $\frac{8a}{6a^2-10a}$ (c) $\frac{4x^2+12x}{16x+48}$

(d) $\frac{2x+6}{x^2+8x+15}$ (e) $\frac{m^2-m-30}{5m-30}$

(f) $\frac{n^2-25}{n^2+12n+35}$ (g) $\frac{x^2-x-56}{x^2+9x+14}$

3. Solve the following problems.

(a) $\frac{3x}{5} + \frac{6x}{7}$ (b) $\frac{5n}{4} + \frac{2n}{3}$

4. Solve the following problems.

(a) $\frac{2x+5}{3} + \frac{3x-4}{4}$ (b) $\frac{3n+2}{5} - \frac{2n-7}{6}$

(c) $\frac{8a^2}{15} \times \frac{3}{4a}$ (d) $\frac{2x}{9} \div \frac{4x^2}{3}$

(e) $\frac{3x+15}{4x-16} \times \frac{x^2-16}{x^2+9x+20}$

(f) $\frac{3x-21}{x^2-11x+28} \div \frac{x^2-x-56}{x^2-12x+32}$

Master Maths 10 Worksheet 18
Formulae and Transposition

18

Name: _____

1. Write the following statements as formulae.

(a) B is equal to twice the sum of C and D .

(b) Energy E is equal to the product of mass (m), gravitational field strength (g) and height (h).

2. Transpose the following formula to make the pronumeral in the brackets the subject.

(a) $D = A - F$ (A)

(b) $p = mv$ (v)

(c) $G = 3M + PQ$ (M)

(d) $T = am + 3m$ (m)

(e) $E = 3ln^2$ (n)

(f) $F = \frac{mv^2}{2}$ (v)

(g) $L = \sqrt{2AB + C}$ (A)

(h) $K = 2(m - n)^2$ (m)

(i) $P = 3D - 2R^2$ (R)

Name: _____

1. Substitute the given quantities into the following equations to find the unknown quantity.

(a) $E = \frac{mv^2}{2} + mgh$

Find E if $m = 8.4$, $v = 14$, $g = 9.8$ and $h = 20$

(b) $s = ut + \frac{1}{2}at^2$

Find s if $u = 8.5$, $t = 6.2$ and $a = -2.5$

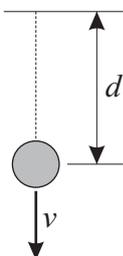
(c) $x = \frac{-b - \sqrt{b^2 - 4ac}}{2a}$

Find x if $a = 12$, $b = -2$ and $c = -30$

2. The velocity (v), in m/s, of an object after it has fallen a distance (d), in m, can be calculated using the following formula.

$$v = \sqrt{2gd}$$

Where $g = 9.8 \text{ m/s}^2$



Find the velocity, in m/s, of an object that has fallen 25 m.

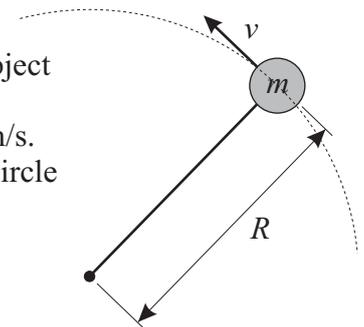
Give answer correct to one decimal place.

3. (a) Transpose the formula from question 2 to make d the subject.

(b) Find the distance an object has fallen if it has reached a velocity of 35.6 m/s. Give answer correct to one decimal place.

4. The object shown below is attached to a string and is travelling in a circular path.

The mass of the object is m kg.
The velocity is v m/s.
The radius of the circle is R m.



The tension, T , in the string can be calculated by using the following formula.

$$T = \frac{mv^2}{R}$$

The unit of tension is Newtons (N).

(a) Find the tension in the string if the mass is 1.4 kg, its velocity is 1.5 m/s and the radius of the circle is 2 m.

(b) Find the tension in the string if the mass is 400 g, the velocity is 5.6 m/s and the radius of the circle is 88 cm.

Give answer correct to one decimal place.

Master Maths 10 Worksheet 20

Exponentials 1

20

Name: _____

1. Write in exponent form.

$x \times y \times 3x \times 4y \times x \times x \times x \times y$

2. Simplify the following expressions.

(a) $x^5 \times x^6$ (b) $2m^4 \times 5n^3 \times m^7 \times 2n \times n^5$

(c) $2a^4b^5c \times 6a^5b^3c^6$ (d) $y^8 \div y^5$

(e) $\frac{8m^8n^{12}}{4m^6n}$ (f) $\frac{20a^6b^9c^4}{16ab^5c^4}$

(g) $(a^3)^4$ (h) $(2m^5)^6$ (i) $(2x^5y^6z)^3$

(j) $\left(\frac{m^4n^3}{p^2}\right)^4$ (k) $\left(\frac{2a^3b^2c^6}{3m^4n}\right)^5$

(l) x^0 (m) $6m^0$ (n) $(x^2y^3)^0 + (7x)^0 + 6x^0$

3. Write the following with positive indices.

$\frac{3}{4}a^4b^{-5}c^{-1}$

4. Simplify the following expressions.

(a) $\frac{(x^4y^5)^2 \times (x^2y^3)^3}{x^5y^7}$ (b) $\frac{(m^3n^4)^3 \times (m^6n^5)^4}{(m^2n^4)^6}$

(c) $\left(\frac{3a^5b^4}{2a^3b}\right)^4$ (d) $\left(\frac{4x^7y^8}{9x^2y^3}\right)^2$

5. Write the following surds in index form.

(a) $\sqrt[4]{m}$ (b) $(\sqrt[5]{a})^6$

6. Use a calculator to evaluate the following.

(a) $5^7 - 7^5$ (b) $8^{\frac{8}{3}}$ (c) $(\sqrt[4]{28\,561})^3$

7. Simplify the following.

(a) $\frac{x^{\frac{1}{2}}y^{\frac{2}{3}} \times x^{\frac{9}{4}}y^{\frac{2}{9}}}{x^2y^{\frac{7}{9}}}$ (b) $\frac{(m^{\frac{1}{2}}n^{\frac{3}{4}})^8 \times (m^{\frac{5}{6}}n^{\frac{2}{3}})^6}{(m^2n^{\frac{5}{4}})^4}$

Master Maths 10 Worksheet 21

Exponentials 2

21

Name: _____

1. Convert the following numbers into scientific notation.

(a) 700 000

(b) 1 260 000 000

(c) 0.000 002

(d) 0.000 000 009 52

2. Convert the following numbers into numeral form.

(a) 8×10^7

(b) 3.21×10^6

(c) 4×10^{-8}

(d) 7.753×10^{-5}

3. Use a calculator to evaluate the following, given that:

$$A = 3.2 \times 10^5, B = 4.5 \times 10^{-7}, C = 8.6 \times 10^{12}$$

Give answers in scientific notation to one decimal place.

(a) ABC

(b) $\frac{2AB^2}{C^3}$

(c) $\sqrt{AB^3C^5}$

4. The mass of the Earth is 5.98×10^{24} kg.
The mass of the Moon is 7.36×10^{22} kg.
How many Moons would have the same mass as the Earth?

5. The population of a town is 7000 and is increasing by 4% each year.
Calculate the population in eight years.
Give answer to the nearest whole number.

6. The value of an \$85 000 tractor was depreciating by 5% each year.
Calculate the value of the tractor in 10 years.
Give answer correct to the nearest dollar.

7. The population of bacteria on an item of food after it was taken out of a refrigerator could be calculated by the following formula:

$$N = 3000 \times 2.5^t$$

Where N = the number of bacteria
and t = the number of hours after it was taken out of the refrigerator

How many bacteria would be on the food after the following time periods?

(Give answer in scientific notation correct to one decimal place)

(a) 2 hours

(b) 36 hours

(c) 1 week

Master Maths 10 Worksheet 22

Solving Linear Equations

22

Name: _____

1. Solve the following equations.

Any answers that are fractions write in their simplest form.

(a) $3x = 21$

(b) $m + 5 = -7$

(c) $\frac{a}{4} - 6 = -4$

(d) $8m + 5 = 11$

(e) $\frac{n+4}{3} = 1$

(f) $\frac{8x}{5} = 2$

(g) $\frac{4n+5}{3} = -1$

(h) $\frac{4a}{9} + 5 = -3$

(i) $\frac{3x-5}{4} + 1 = 5$

(j) $\frac{2n-5}{8} - 4 = -7$

(k) $7 - 4a = -5$

(l) $3(4x - 5) = 9$

(m) $3m + 1 = 5m - 7$

(n) $2m - 9 = 3(2m + 5)$

(o) $\frac{3}{5x} = 6$

(p) $\frac{x}{3x+1} = \frac{4}{5}$

2. Write the following statement as an equation and solve.

If seven is subtracted from three times this number and the result is multiplied by four the answer is 32.

equation

3. A 10 kg watermelon is cut into three pieces. The largest piece is 1 kg heavier than the next and 2.5 kg heavier than the smallest. What does the heaviest piece weigh?

Master Maths 10 Worksheet 23
Solving Quadratic Equations 1

23

Name: _____

Solve the following equations.

Any answers that are fractions write in their simplest form.

1. $x^2 - 5x = 0$

2. $x^2 + 7x = 0$

3. $3x^2 = 5x$

4. $9x^2 = -4x$

5. $x^2 - 49 = 0$

6. $16x^2 - 25 = 0$

7. $x^2 - 7 = 0$

8. $4x^2 - 12 = 0$

9. $(x - 2)^2 - 9 = 0$

10. $9(x + 3)^2 - 64 = 0$

11. $25(x - 3)^2 - 81(x + 5)^2 = 0$

Master Maths 10 Worksheet 24
Solving Quadratic Equations 2

24

Name: _____

1. Solve the following equations.

Any answers that are fractions write in their simplest form.

(a) $x^2 - 9x + 14 = 0$

(b) $x^2 - 7x - 18 = 0$

(c) $2x^2 + 7x - 15 = 0$

(d) $15x^2 + 8x - 16 = 0$

2. Use the quadratic formula to solve the following equations.

(a) $20x^2 + 11x - 42 = 0$

(b) $5x^2 - 6x - 4 = 0$

Master Maths 10 Worksheet 25
Problem Solving

25

Name: _____

1. The perimeter of a rectangular park is 550 m. The length is 35 m longer than the width. Find the length and width of the park

length	<input type="text"/>
width	<input type="text"/>

2. Polly is 28 years older than her daughter Molly. Polly's mother Dolly is four times Molly's age. The sum of their three ages is 130. How old is Molly?

3. Byron found that one dozen eggs weighed the same as five apples. He also found that two eggs and 22 grams weighed the same as one apple. Find the mass of an egg and an apple.

egg	<input type="text"/>
apple	<input type="text"/>

4. Danni and Tarkyn work at a restaurant. Danni cooks and Tarkyn washes. A cook gets paid \$6 more an hour than a washer. In one week Danni works 15 hours and Tarkyn works 20 hours. They earn a total of \$755. What is the hourly pay rate of each person?

Danni	<input type="text"/>
Tarkyn	<input type="text"/>

5. Janice had a water tank with two different sized taps. If she used tap A the tank would empty in 6 hours. If she used tap B the tank would empty in 3 hours. How long would it take the tank to empty if both taps were open?

6. Hags had two paddocks of cows. He knew that the cows in paddock A ate 20% more food than the cows in paddock B. He wanted to distribute 110 kg of food so that the cows in both paddocks would finish the food at the same time. How much food should he put in each paddock?

paddock A	<input type="text"/>
paddock B	<input type="text"/>

Master Maths 10 Worksheet 26

Linear Relationships

26

Name: _____

1. Complete the table of values for each of the following rules.

(a) $y = 3x + 1$

x	-3	-2	-1	0	1	2	3
y							

(b) $m = 4 - 2n$

n	-3	-2	-1	0	1	2	3
m							

2. Find the rule connecting the variables in the tables below.

(a)

x	-3	-2	-1	0	1	2	3
y	-9	-7	-5	-3	-1	1	3

(b)

A	-3	-2	-1	0	1	2	3
B	-2	1	4	7	10	13	16

(c)

c	-3	-2	-1	0	1	2	3
d	17	13	9	5	1	-3	-7

(d)

P	0	2	7	10	12	22	30
Q	5	9	19	25	29	49	65

3. Complete the table of values below for the relationship shown.

$M = 6N + 25$

N	0	5	8		15		25
M				85		157	

4. The fuel consumption (L/hr) of a boat was measured for different numbers of passengers and shown in the table below.
 N = the number of passengers.
 F = fuel consumption (L/hr)

N	0	1	2	3	4	5	6
F	5	5.5	6	6.5	7	7.5	8

(a) Complete the equation for this relationship.

$F =$

(b) Find the fuel consumption for the following number of passengers.

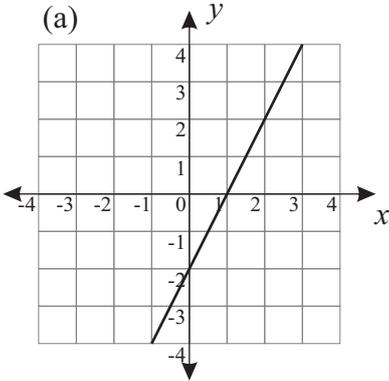
- (i) 8 passengers (ii) 15 passengers

(c) Find the number of passengers if the fuel consumption was 25 L/hr.

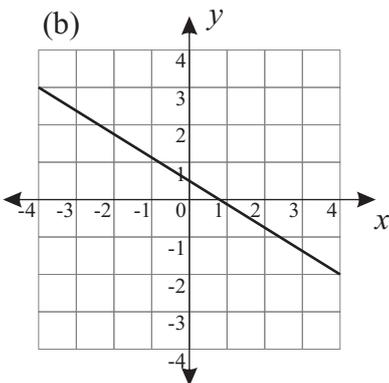
Name: _____

1. Find the gradient of the lines shown on the following graphs.

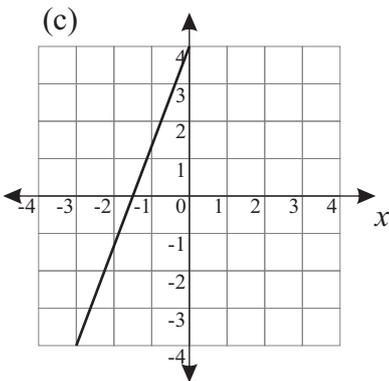
(a)



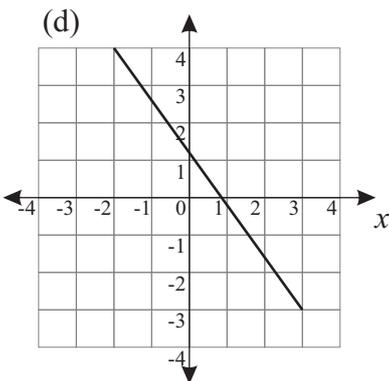
(b)



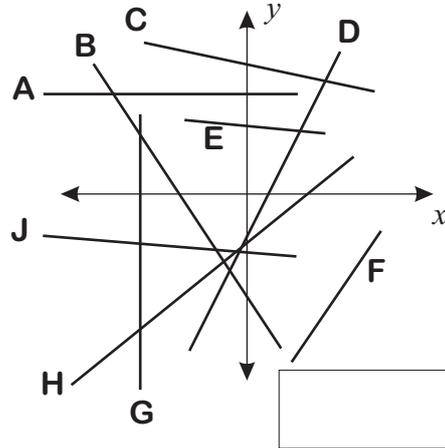
(c)



(d)



2. Which of the lines on the graph below have a **negative** gradient?



3. What is the gradient of a straight line that has an x -intercept of -3 and a y -intercept of 7 ?

4. Find the gradient of the straight lines joining the following pairs of points.

(a) $(2,4)$ and $(9,15)$

(b) $(-3,7)$ and $(6,-11)$

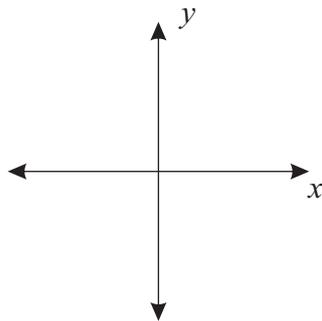
(c) $(-2,-9)$ and $(5,-6)$

(d) $(-8,7)$ and $(9,7)$

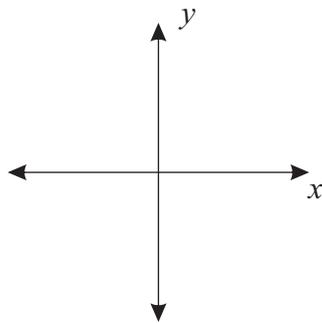
Name: _____

1. Find the x -intercept and y -intercept of the straight lines with the following equations and sketch the straight line on the axes shown clearly showing the intercept points.

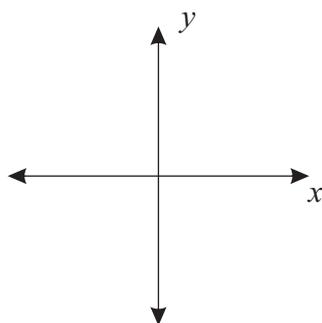
(a) $x + 3y = 9$



(b) $3x - 4y = 24$



(c) $y = 5x - 15$



2. Transpose the following equations to make y the subject and hence find the gradient and y -intercept.

(a) $9x + 3y = 12$

$y =$

gradient

y -intercept

(b) $8x + 2y + 7 = 0$

$y =$

gradient

y -intercept

(c) $7y - 6x + 4 = 0$

$y =$

gradient

y -intercept

Master Maths 10 Worksheet 29
Straight Lines

29

Name: _____

1. Find the equation of the straight line that has a gradient of 2 and passes through (3,2).

$y =$

2. Find the equation of the straight line that passes through the points (-4,3) and (1,-7).

$y =$

3. Find the equation of the straight line that has an x -intercept of -3 and y -intercept of 9.

$y =$

4. Find the x -intercept and y -intercept of the straight line that has a gradient of -4 and passes through (-2,9).

x -intercept

y -intercept

5. Find the distance between the points (-1,-3) and (11,2).

Master Maths 10 Worksheet 30

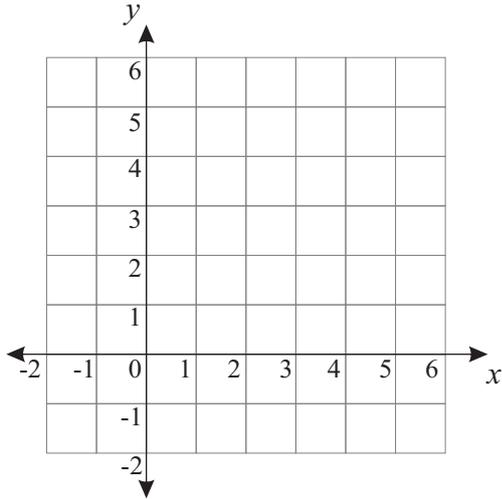
Simultaneous Equations 1

30

Name: _____

1. (a) On the axes below draw the straight lines with the equations:

$$y = 2x - 1 \quad \text{and} \quad y = -x + 5$$



- (b) What is the point of intersection of these two lines?

- (c) Use the method of substitution of simultaneous equations to find this point of intersection.

2. Solve the following simultaneous equations using substitution.

(a) $y = 3x$ and $y = x + 6$

(b) $y = 2x - 5$ and $2y + 3x = -24$

3. Solve the following simultaneous equations using elimination.

(a) $x + y = 7$ and $x - y = 9$

(b) $3x + y = 4$ and $x + y = 0$

Master Maths 10 Worksheet 31
Simultaneous Equations 2

31

Name: _____

1. Solve the following simultaneous equations by choosing the most appropriate method - substitution or elimination.

(a) $2x + 3y = -5$ and $x - 5y = 17$

(b) $3y + 4x = 7$ and $2y - 3x = -18$

2. Three pies and four quiches cost \$36.
Two pies and five quiches cost \$38.
Find the price of a pie and a quiche.

pie

quiche

3. It took four large buckets and eight small buckets to fill a container that held 144 litres.
It took six large buckets and ten small buckets to fill a container that held 200 litres.
What was the capacity of each bucket?

large
bucket

small
bucket

Name: _____

1. State which of the following are quadratic equations.

A $y = 3x^2 + 5$

B $m = 2n - 5$

C $b = 7 - 2a^3$

D $p = 8 + q^2$

E $y = x^3 + 2x^2 - 1$

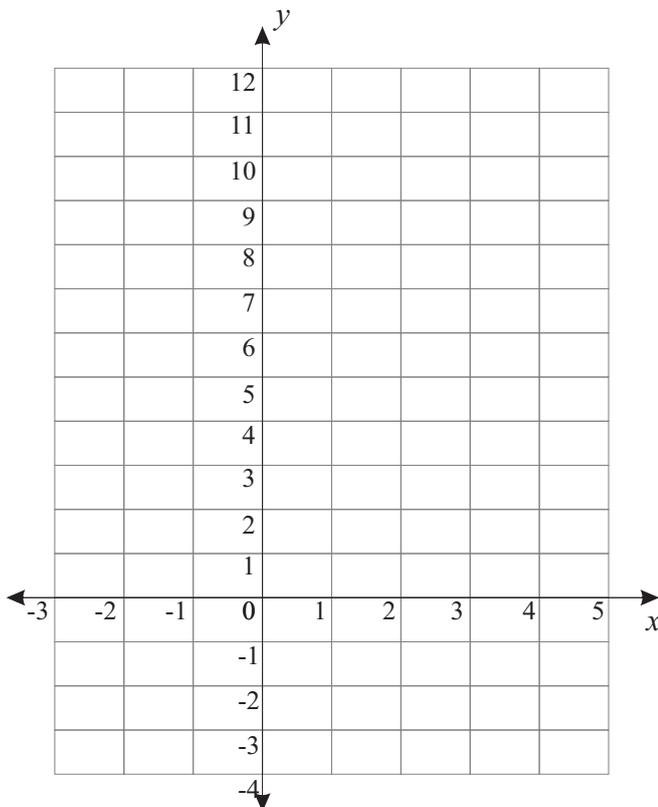
F $d = 2c^2 + 7c - 5$

2. (a) Complete the table of values below for the following equation.

$$y = x^2 - 2x - 3$$

x	-3	-2	-1	0	1	2	3	4	5
y									

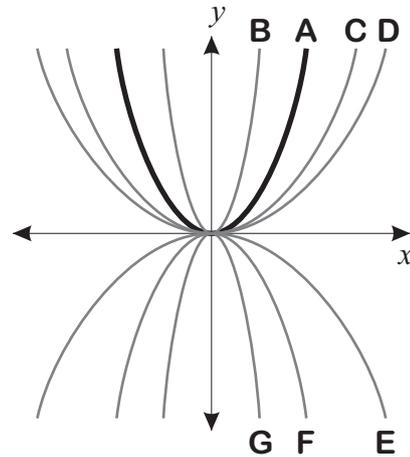
(b) Plot these points on the graph below and connect them with a smooth curve.



(c) What are the coordinates of the turning point?

(d) Is this a maximum (**MAX**) or minimum (**MIN**) turning point?

3. Parabola **A** below has the equation $y = x^2$.



Match the other labelled parabolas with the following equations.

$y = 2x^2$ $y = -x^2$ $y = \frac{1}{2}x^2$

$y = \frac{1}{3}x^2$ $y = -2x^2$ $y = -\frac{1}{3}x^2$

4. Which of the parabolas in question 3 have **maximum** turning points?

5. If the equations of the parabolas below were graphed:

(a) which would be **flatter** than the graph of $y = x^2$?

(b) which would have **maximum** turning points?

A $y = 2x^2 + 3$

B $y = -5x^2 + 4x - 3$

C $y = \frac{1}{3}x^2 - 6x + 7$

D $y = 9x - 2x^2$

E $y = -\frac{1}{2}x^2 + 4x$

F $y = 8 + \frac{2}{5}x^2$

G $y = 1 - \frac{3}{4}x^2$

H $y = -3x + \frac{7}{9}x^2$

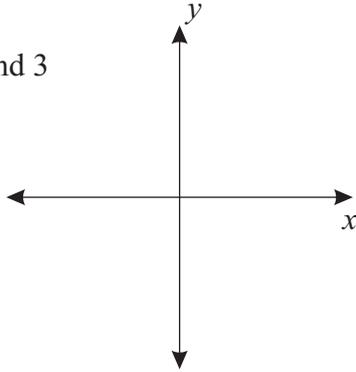
I $y = \frac{7}{3}x^2 + x$

J $y = 4 - 3x^2 + 7x$

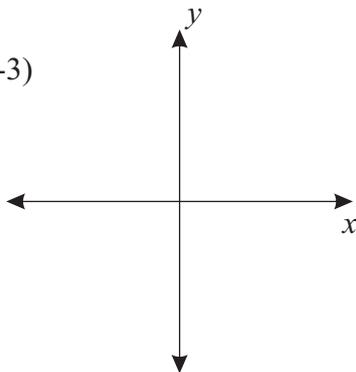
Name: _____

Sketch the following parabolas clearly showing all known points

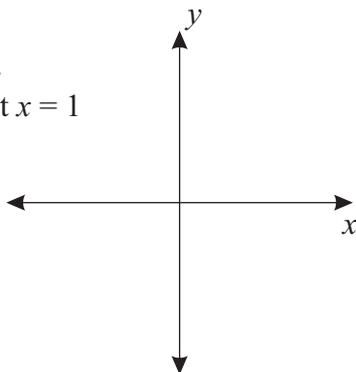
1. This parabola has:
- x -intercepts at -1 and 3
- y -intercept at -1



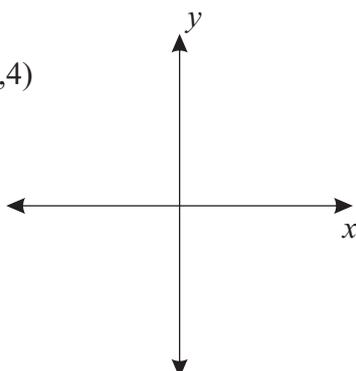
2. This parabola has:
- turning point at (1,-3)
- y -intercept at -2



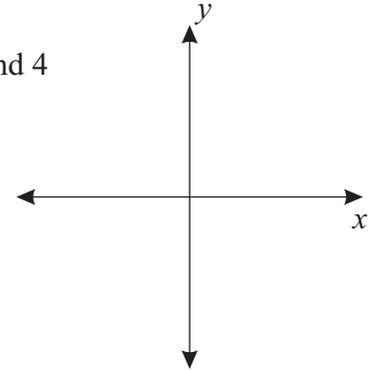
3. This parabola has:
- one x -intercept at 4
- axis of symmetry at $x = 1$
- y -intercept at -3



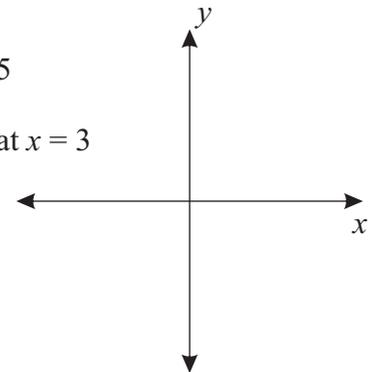
4. This parabola has:
- turning point at (-1,4)
- y -intercept at 3



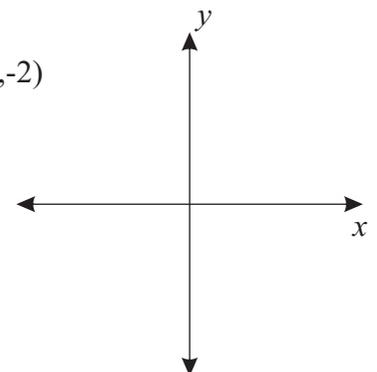
5. This parabola has:
- x -intercepts at 1 and 4
- y -intercept at -1



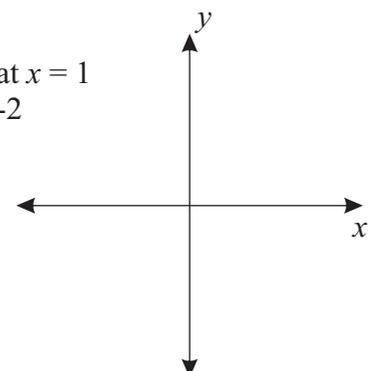
6. This parabola has:
- one x -intercept at 5
- y -intercept at 3
- axis of symmetry at $x = 3$



7. This parabola has:
- turning point at (2,-2)
- y -intercept at -5



8. This parabola has:
- axis of symmetry at $x = 1$
- one x -intercept at -2
- y -intercept at 3



Name: _____

1. If the following quadratic equation was to be graphed answer the questions below.

$$y = x^2 - 4x - 12$$

- (a) Find the y -intercept.

- (b) Find the x -intercepts.

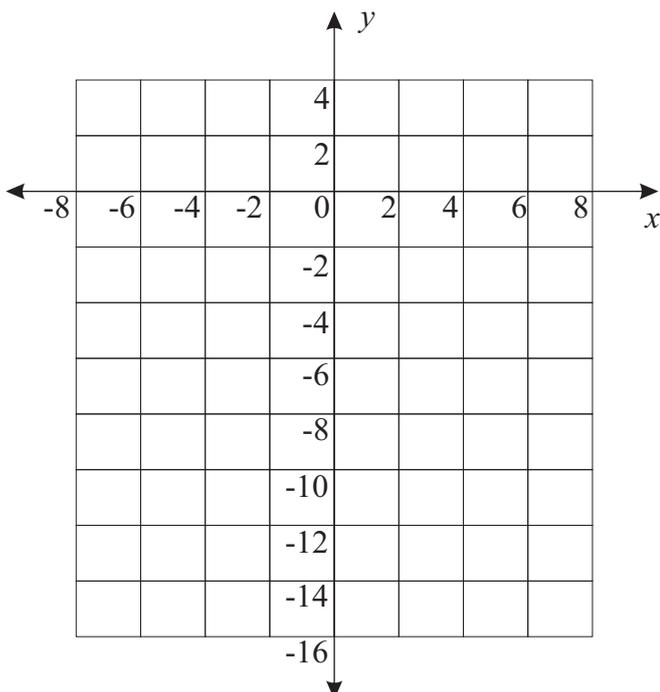
 and

- (c) Find the axis of symmetry.

 $x =$

- (d) Find the coordinates of the turning point.

- (e) Draw the graph on the axes below.



2. If the following quadratic equation was to be graphed answer the questions below.

$$y = x^2 - x - 6$$

- (a) Find the y -intercept.

- (b) Find the x -intercepts.

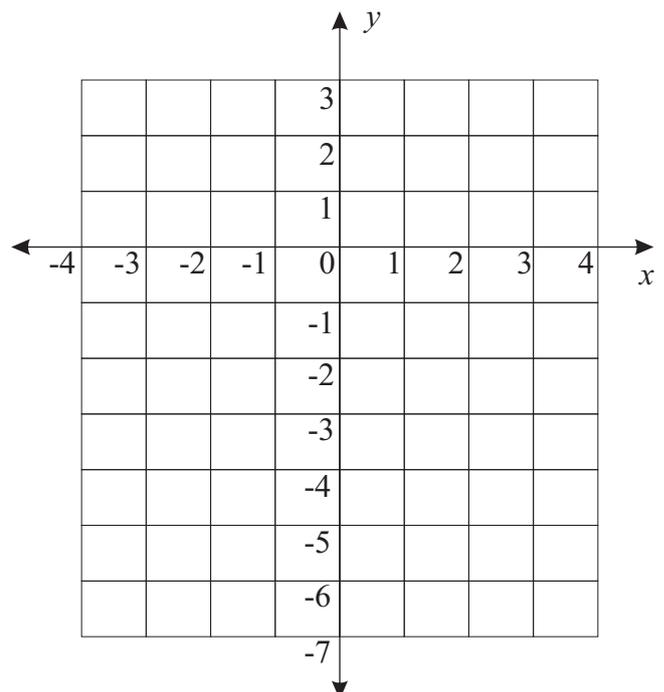
 and

- (c) Find the axis of symmetry.

 $x =$

- (d) Find the coordinates of the turning point.

- (e) Draw the graph on the axes below.



Master Maths 10 Worksheet 35
Sketching Parabolas 3

35

Name: _____

If the following quadratic equation was to be graphed answer the questions below.

$$y = -6x^2 + 7x + 20$$

1. Find the y-intercept.

2. Use the quadratic formula to find the x-intercepts.

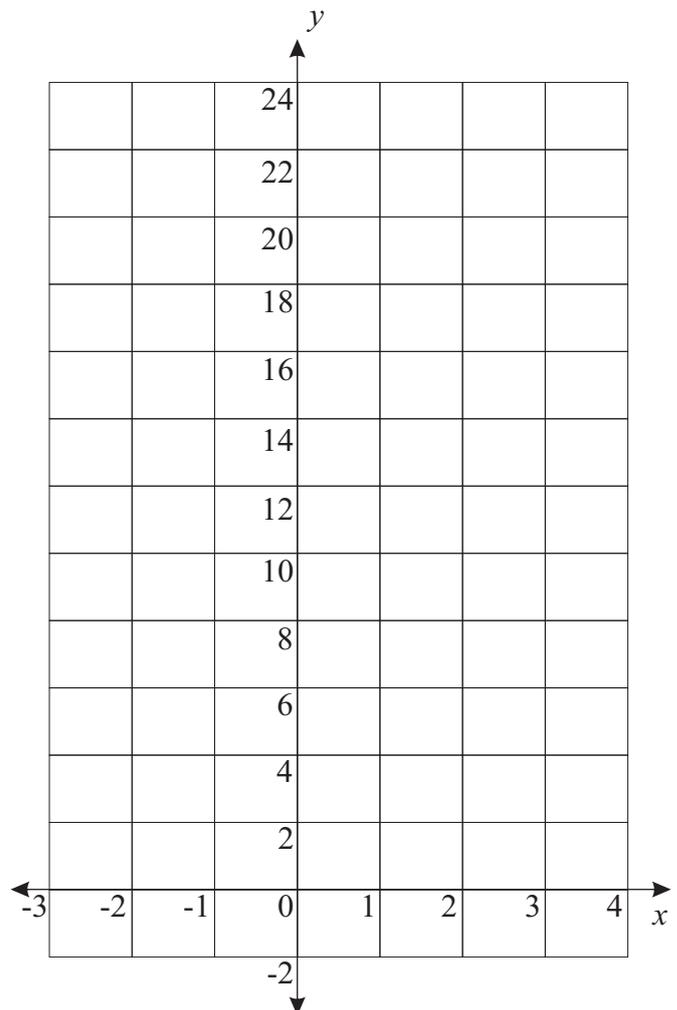
 and

3. Find the axis of symmetry.

 $x =$

4. Find the coordinates of the turning point.

5. Draw the graph on the axes below.



$$y = a(x - h)^2 + k$$

Name: _____

For each of the following quadratic equations:

(a) Convert to the turning point form:

$$y = a(x - h)^2 + k$$

(b) State the turning point if this equation was graphed.

(c) State the y -intercept.

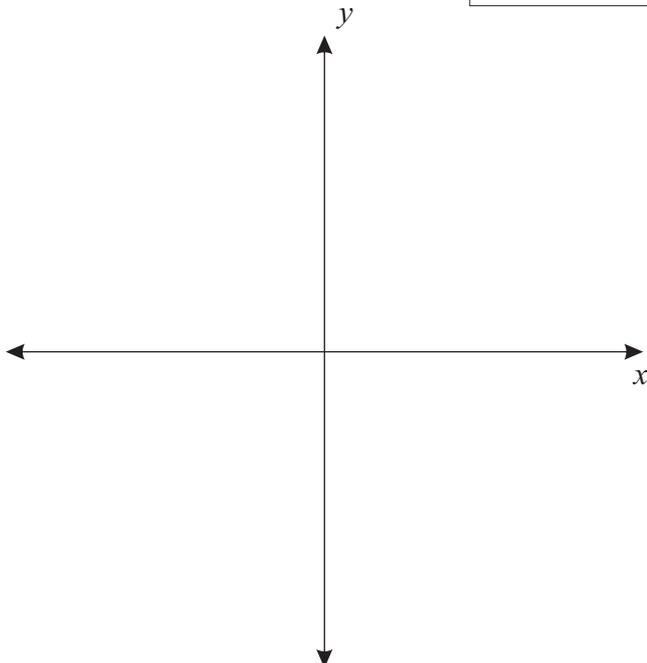
(d) Sketch the graph showing the turning point and y -intercept.

1. $y = x^2 - 6x + 14$

turning point form

turning point

y -intercept

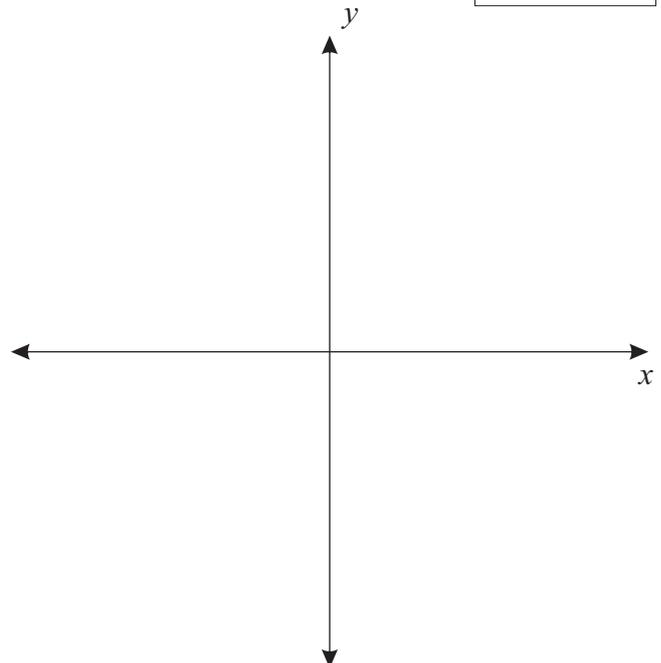


2. $y = -2x^2 - 6x - 8$

turning point form

turning point

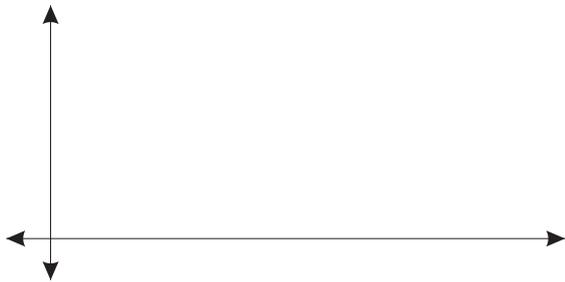
y -intercept



Name: _____

1. A footballer kicks a ball that follows a parabolic trajectory. The ball just clears a 25 m high pole at the top of its trajectory. The pole is 30 m from the footballer.

(a) Draw the ball's trajectory on the coordinate axes below using the origin as the point where the ball was kicked. Clearly show all known points.

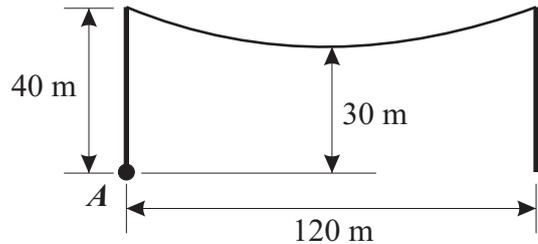


(b) Find the equation of the trajectory in turning point form:

$$y = a(x - h)^2 + k$$

(c) Find the height of the ball 24 metres from where it was kicked.

2. A cable hangs between two pylons. The pylons are 40 metres high and 120 metres apart. The lowest point of the cable is 30 metres above the ground.



(a) Using point *A* as the origin, find the equation of the parabolic shape of the cable in turning point form.

(b) Find the height of the cable above the ground for the following distances from *A*. Give answers correct to one decimal place.

(i) 10 m

(ii) 70 m

Master Maths 10 Worksheet 38

Variation 1

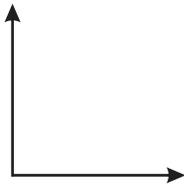
38

Name: _____

1. For the following situations state which is the **independent variable** and label the axes correctly.

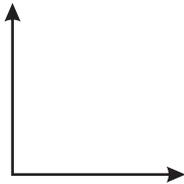
- (a) The speed (S) of a ball when it reaches the ground is measured for different heights (H) that it is dropped.

Independent Variable



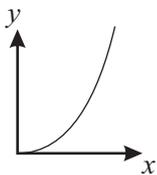
- (b) The amount of carbon dioxide (A) sequestered is measured for a differing number of trees (N) in a plantation.

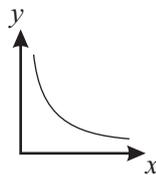
Independent Variable

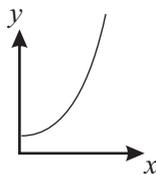


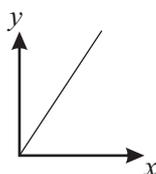
2. Match the graphs below with the different types of variation relationships.

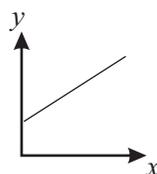
- A** - direct linear variation
B - direct quadratic variation
C - exponential variation
D - partial variation
E - inverse variation











3. Match the equations below with the different types of variation relationships.

- A** - direct linear variation
B - direct quadratic variation
C - exponential variation
D - partial variation
E - inverse variation

$y = kn^x$ $y = kx$ $y = \frac{k}{x}$ $y = kx^2$ $y = kx + c$

4. Which type of variation relationship (**A-E**) applies to the following sets of data?

(a)

x	2	4	6	8
y	24	12	8	6

(b)

x	0	1	2	3
y	0	3	12	27

(c)

x	0	1	2	3
y	0	6	12	18

(d)

x	0	1	2	3
y	2	6	18	54

(e)

x	0	1	2	3
y	0.5	1	2	4

(f)

x	0	1	2	3
y	2	5	8	11

Master Maths 10 Worksheet 39

Variation 2

39

Name: _____

1. Match the equations below with the different types of variation relationships.

- A** - direct linear variation
- B** - direct quadratic variation
- C** - exponential variation
- D** - partial variation
- E** - inverse variation

$y = kn^x$ $y = kx$ $y = \frac{k}{x}$ $y = kx^2$ $y = kx + c$

2. The table below shows the price (P), in dollars, to buy different numbers (N) of concert tickets.

N	1	2	3	4
P	25	45	65	85

- (a) Which of the variation types (**A-E** from question 1) apply to the relationship between N and P ?
- (b) Find all the constant values in this relationship and write the equation.

(c) How much would it cost to buy 15 tickets?

(d) How many tickets could be bought with \$485?

3. The heat (H), in kJ, generated in a resistor was measured for different values of the current (I), in amps.

The results are shown in this table.

I (amps)	1	2	3	4
H (kJ)	20	80	180	320

- (a) Which of the variation types (**A-E** from question 1) apply to the relationship between I and H ?
- (b) Find all the constant values in this relationship and write the equation.

(c) Find the heat generated if the current was 15 amps.

4. The acceleration (a), in m/sec^2 , of an object was measured for different forces (F), in newtons, applied to the object. The results are shown in the table below.

F (newtons)	0	20	40	60
a (m/sec^2)	0	160	320	480

- (a) Which of the variation types (**A-E** from question 1) apply to the relationship between F and a ?
- (b) Find all the constant values in this relationship and write the equation.

Master Maths 10 Worksheet 40

Variation 3

40

Name: _____

1. Match the equations below with the different types of variation relationships.

- A** - direct linear variation
- B** - direct quadratic variation
- C** - exponential variation
- D** - partial variation
- E** - inverse variation

$y = kx$ $y = kn^x$ $y = \frac{k}{x}$ $y = kx + c$ $y = kx^2$

2. Balls with different masses (m), in kg, are projected vertically up by a catapult and the heights (H), in metres, attained are recorded in this table.

m (kg)	0.5	2	4	8
H (m)	16	4	2	1

(a) Which of the variation types (**A-E** from question 1) apply to the relationship between m and H ?

(b) Find all the constant values in this relationship and write the equation.

(c) What height would be attained by a 0.2 kg mass?

(d) What was the mass of a ball that attained a height of 0.8 metres?

3. The number of bacteria (N) on a food sample was recorded every hour (t) after 20 were observed. The results are shown in the table below.

t (hr)	0	1	2	3	4
N	20	40	80	160	320

(a) Which of the variation types (**A-E** from question 1) apply to the relationship between t and N ?

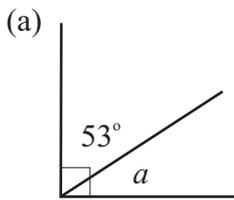
(b) Find all the constant values in this relationship and write the equation.

(c) How many bacteria will be present on the food after 10 hours?

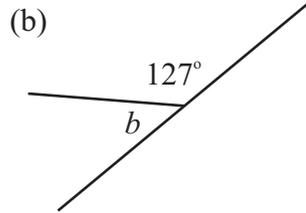
(d) After how many hours will there be more than 20 million bacteria?

Name: _____

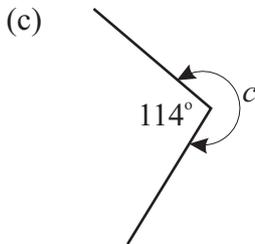
1. Calculate the unknown angles.



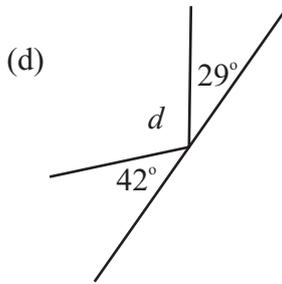
$a =$



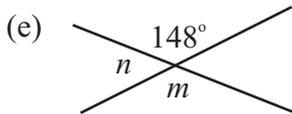
$b =$



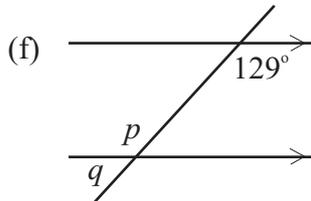
$c =$



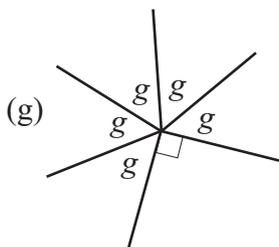
$d =$



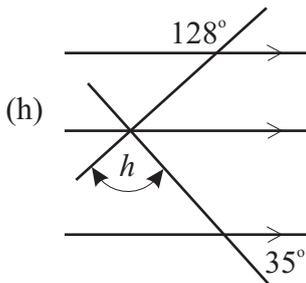
$m =$
 $n =$



$p =$
 $q =$

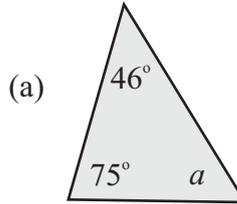


$g =$

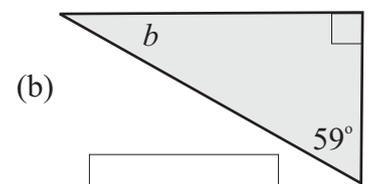


$h =$

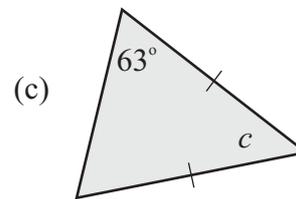
2. Calculate the unknown angles.



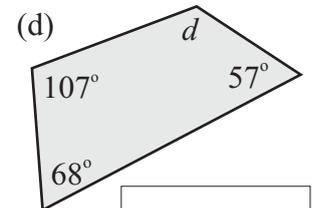
$a =$



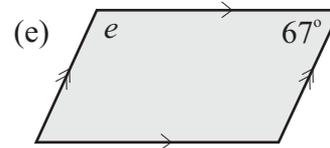
$b =$



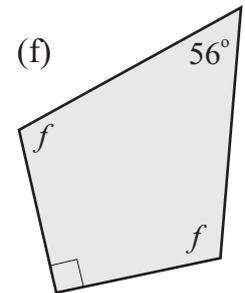
$c =$



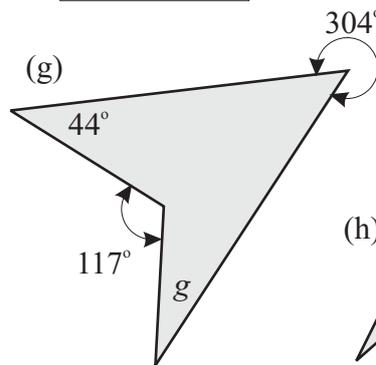
$d =$



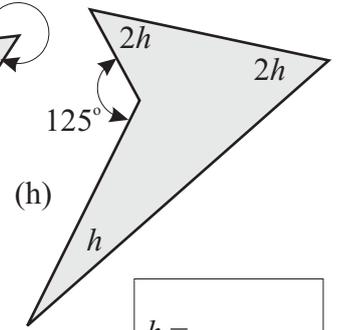
$e =$



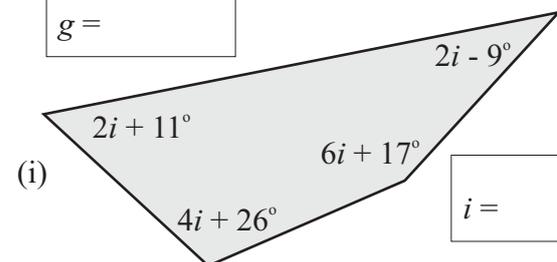
$f =$



$g =$



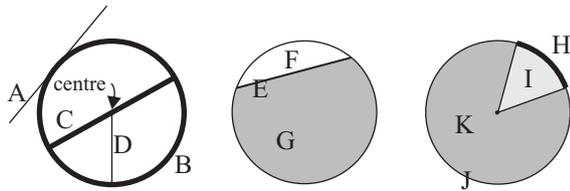
$h =$



$i =$

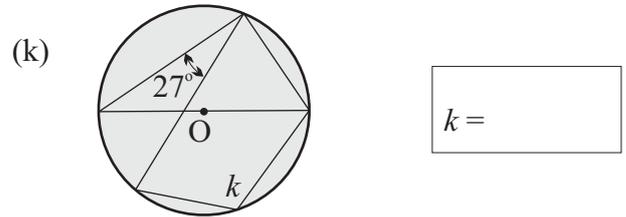
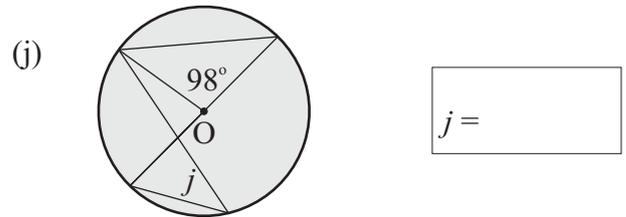
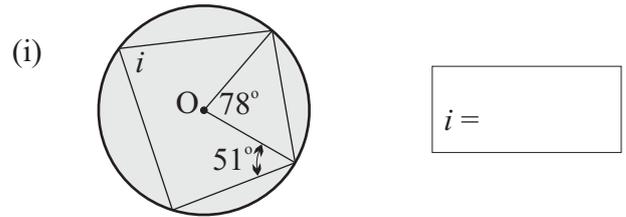
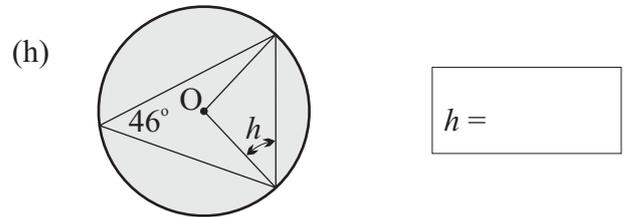
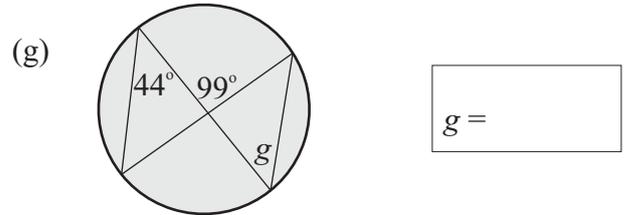
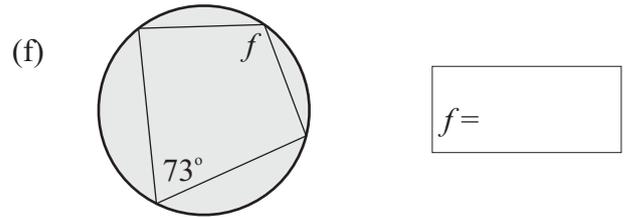
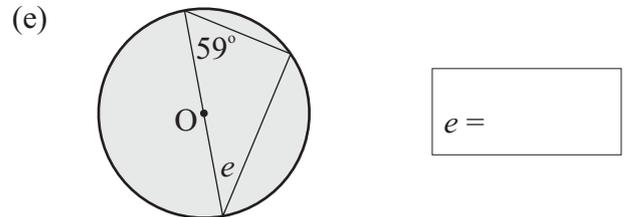
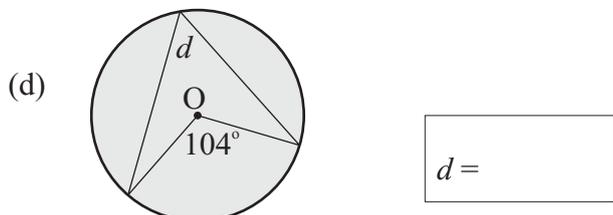
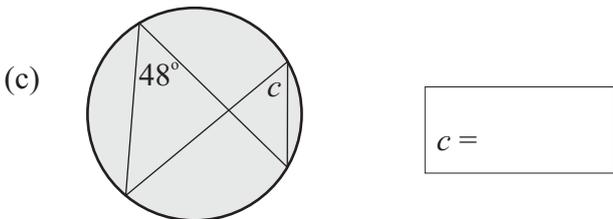
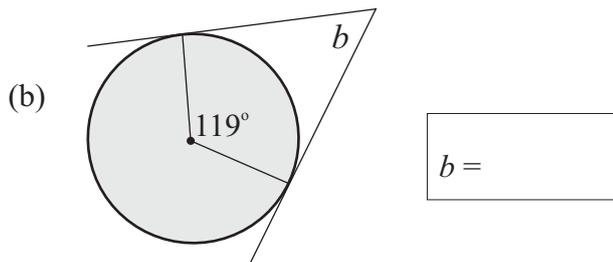
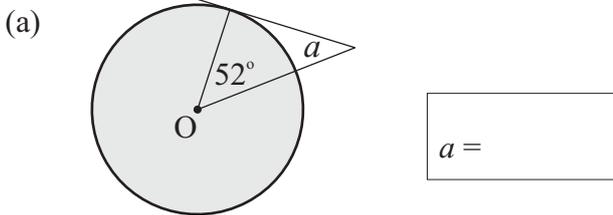
Name: _____

1. Complete the list of names of parts of a circle by inserting the appropriate letter from the diagrams below.



- Minor arc Diameter Tangent
 Major arc Radius Chord
 Major segment Major sector
 Minor segment Minor sector
 Circumference

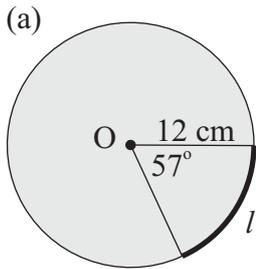
2. Find the unknown angles

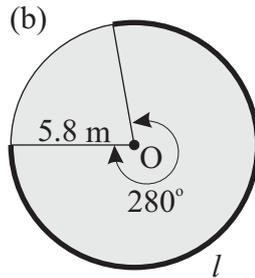


Name: _____

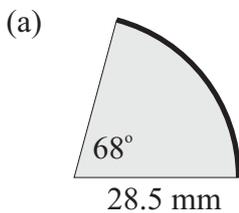
Give answers to questions 1-3 correct to one decimal place

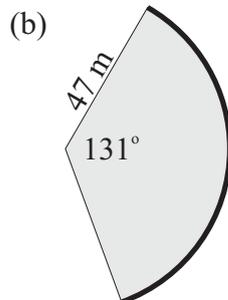
1. Find the arc length shown in each of the following circles.



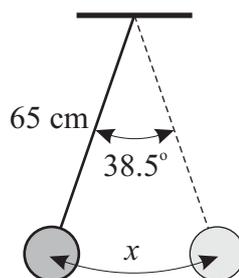


2. Find the following arc lengths.





3. A ball is attached to the end of a 65 cm string and allowed to swing. Through what distance does the ball swing, x , if the angle of swing is 38.5° ?



*For the following questions use 6400 km as the radius of the Earth.
Give answers to the nearest kilometre.*

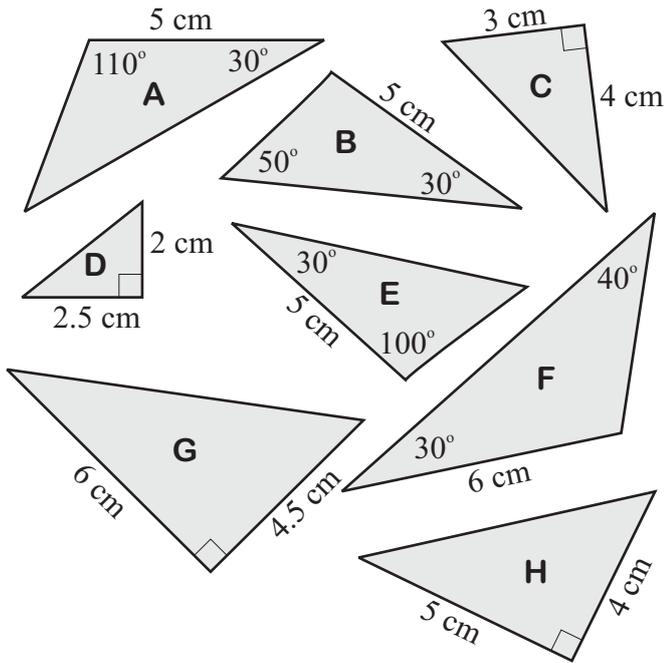
4. A yacht sails along the equator from a longitude of 162°E to 178°E . How far has it sailed?

5. Beijing and Perth are approximately on the same longitude (116°E). Beijing is at a latitude of 39.5°N . Perth is at a latitude of 31.6°S . If an aeroplane flies in a straight line from Perth to Beijing, how far does it travel?

6. Entebbe in Uganda and Quito in Ecuador are both on the equator. Entebbe is at a longitude of 32.29°E . Quito is at a longitude of 78.30°W . If an aeroplane flies directly between these two cities at an average speed of 900 km/h, how long will the flight take? Give answer in hours correct to one decimal place.

Name: _____

1. Match the pairs of similar and congruent triangles from the triangles below.
There are three pairs of similar triangles and one pair of congruent triangles.

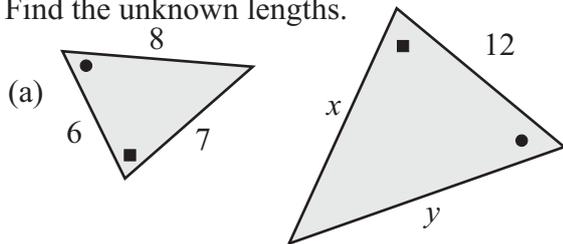


Pairs of similar triangles:

and , and , and

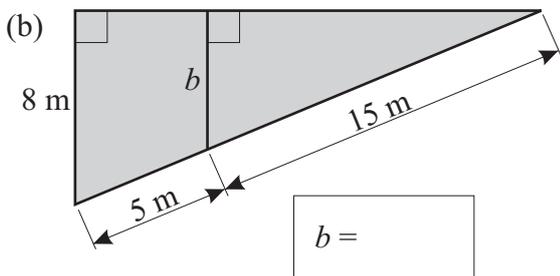
Pair of congruent triangles: and

2. Find the unknown lengths.

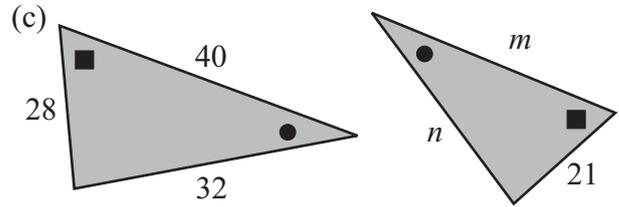


$x =$

$y =$

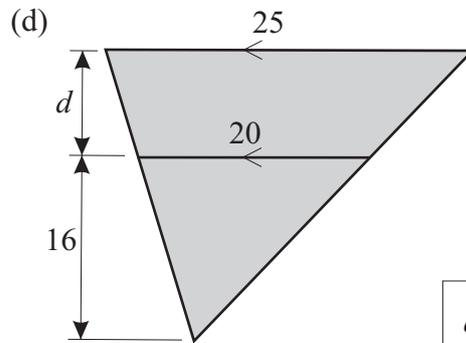


$b =$

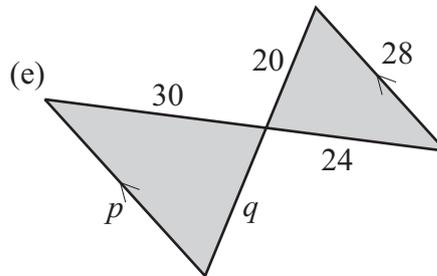


$m =$

$n =$



$d =$



$p =$

$q =$

3. Michael was standing near a camp fire at night and noticed his shadow, cast from the fire onto a nearby tree, was the same height as the tree. Michael is 170 cm tall and measured that he was 2 paces from the fire and 18 paces from the tree. Find the height of the tree in metres.

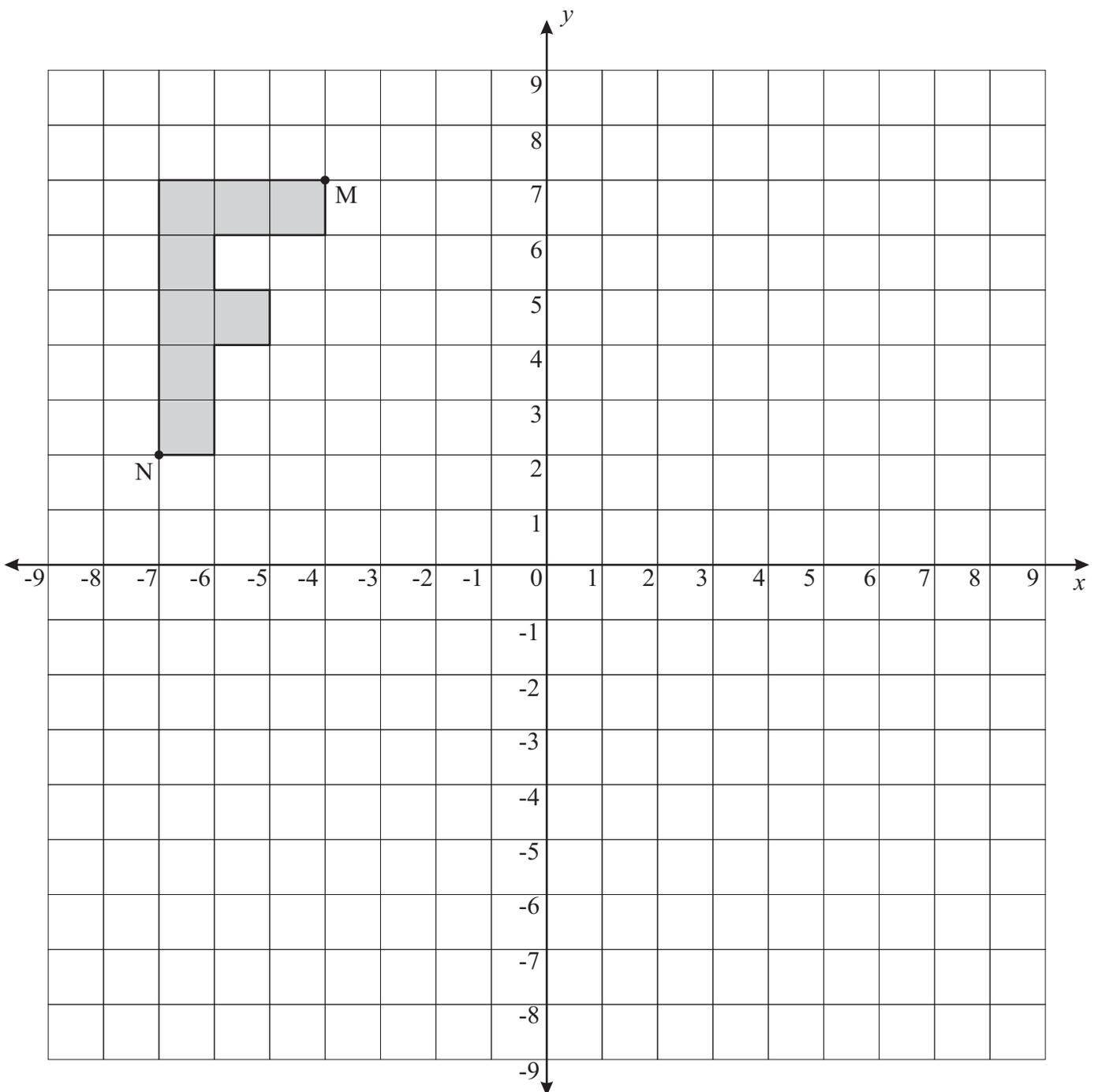
Master Maths 10 Worksheet 45
Transformations

45

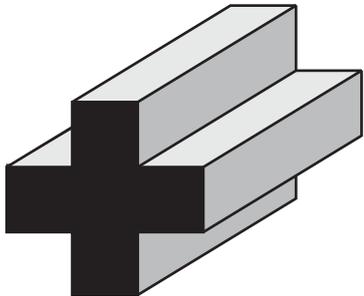
Name: _____

Draw the shape shown below after the following transformations labelling each new shape (**A**, **B**, etc).

- A** - Rotate 90° anticlockwise about M.
- B** - Reflect about the y -axis.
- C** - Translate ten units right and one unit up.
- D** - Rotate 90° clockwise about N then translate nine units right and three units down.
- E** - Rotate 90° anticlockwise about O(0,0).
- F** - Reflect about the x -axis then translate eight units right and two units down.
- G** - Rotate 90° clockwise about N then reflect about the x -axis.



Name: _____



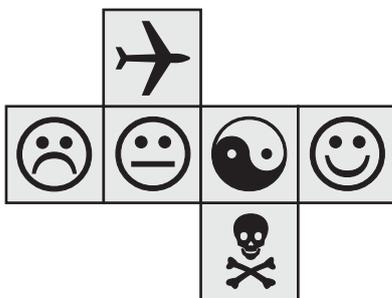
1. (a) For the object above state the number of:

(i) faces (ii) edges (iii) vertices

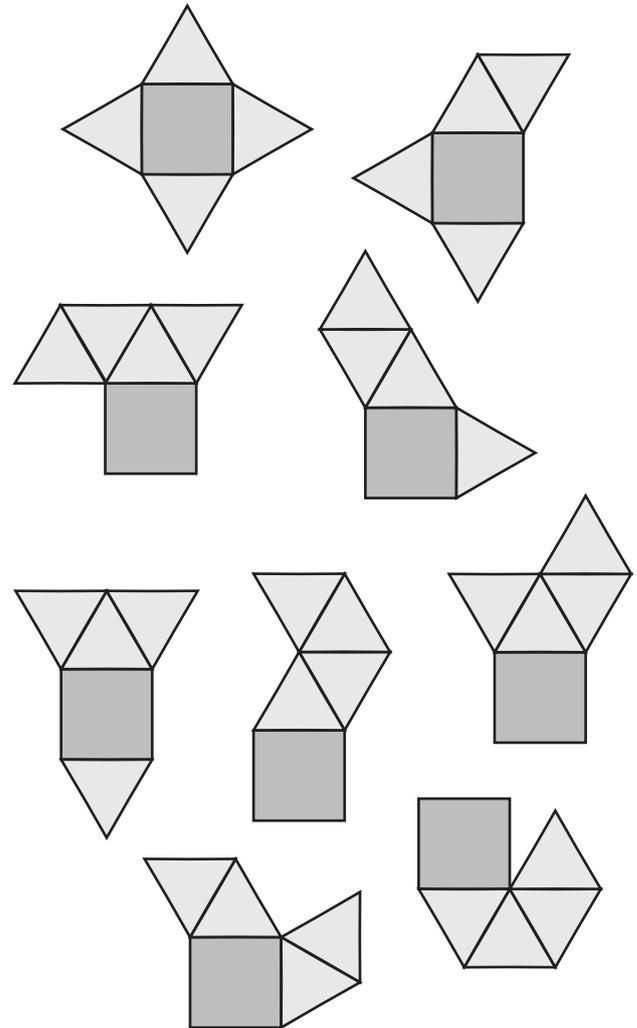
(b) How many faces are parallel to the black face?

(c) How many faces are perpendicular to the black face?

2. Circle the cube/s below that could **NOT** be formed from the following net.



3. (a) Circle the net/s below that could **NOT** form a square-based pyramid.



(b) Without using a ruler sketch a three dimensional drawing of a square-based pyramid below.

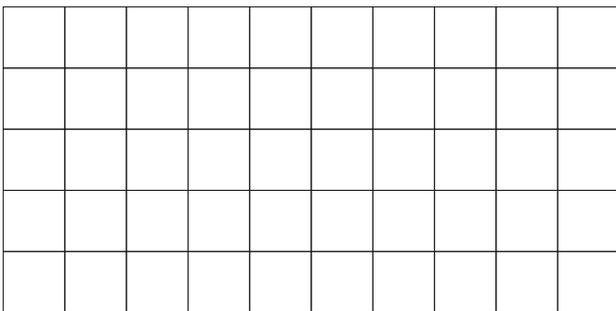
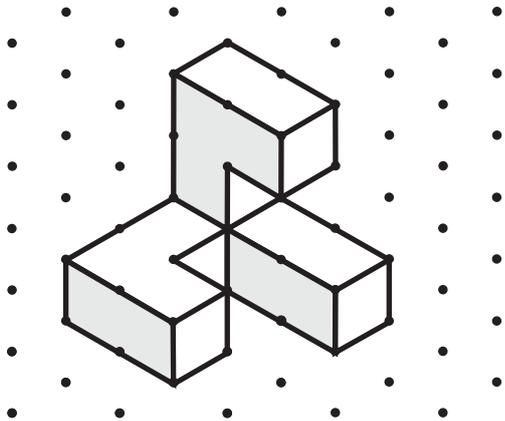
Name: _____

Example

Side View Front View

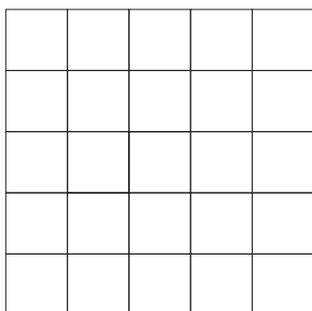
Front View Side View Top View

1. Draw the front, side and top views of this object.



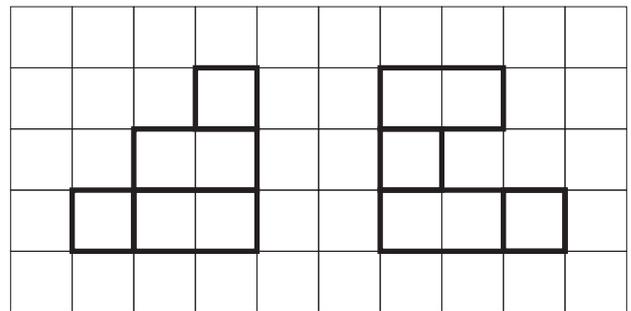
Front View

Side View



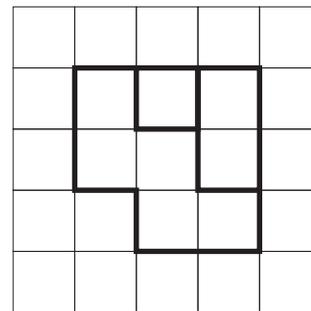
Top View

2. The front, side and top views of an object are shown below. Draw the object on the isometric dots below.

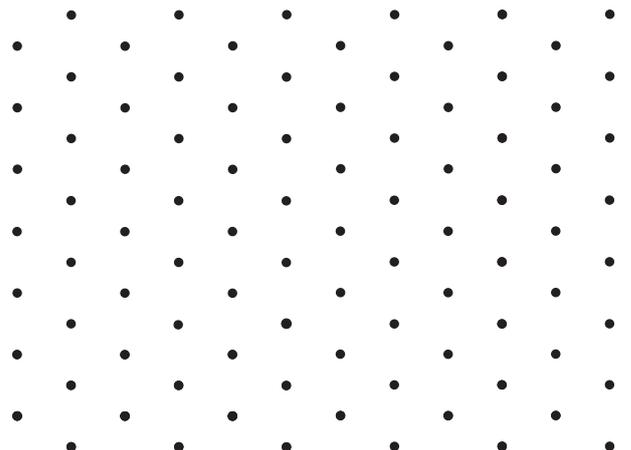


Front View

Side View



Top View



Master Maths 10 Worksheet 48

Length and Perimeter 1

48

Name: _____

1. Change the following lengths to the units shown in the brackets.

(a) 6.3 m (cm) (b) 48.7 mm (cm)

(c) 0.56 km (m) (d) 0.065 m (mm)

(e) 24.67 cm (mm) (f) 45 750 mm (m)

(g) 821.9 cm (m) (h) 67 m (km)

(i) 2 m 8 cm (cm) (j) 24 cm 7 mm (mm)

2. Round the following lengths to the nearest metre.

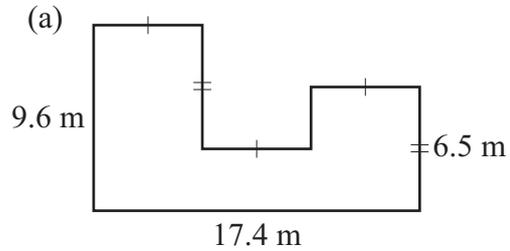
(a) 3.65 m (b) 5 m 9 cm (c) 7 m 641 mm

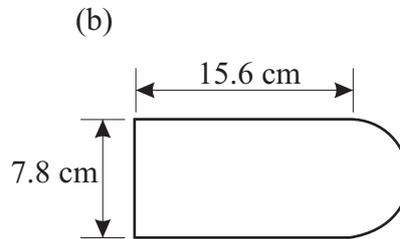
3. How many 150 mm long pieces of wood could be cut from a 3.6 m plank?

4. Tara measured her strides while running to be 75 cm. How many strides would she take to run 15 km?

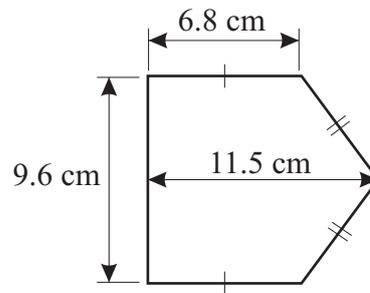
5. Steve's lawnmower has a blade width of 40 cm. The lawn Steve is about to mow is in the shape of a rectangle 16 m wide and 20 m long. What is the total distance Steve will walk to mow the lawn? Give answer in metres.

6. Find the perimeter of the following shapes. Give answers correct to one decimal place.

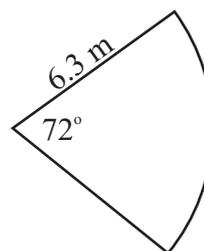




(c)

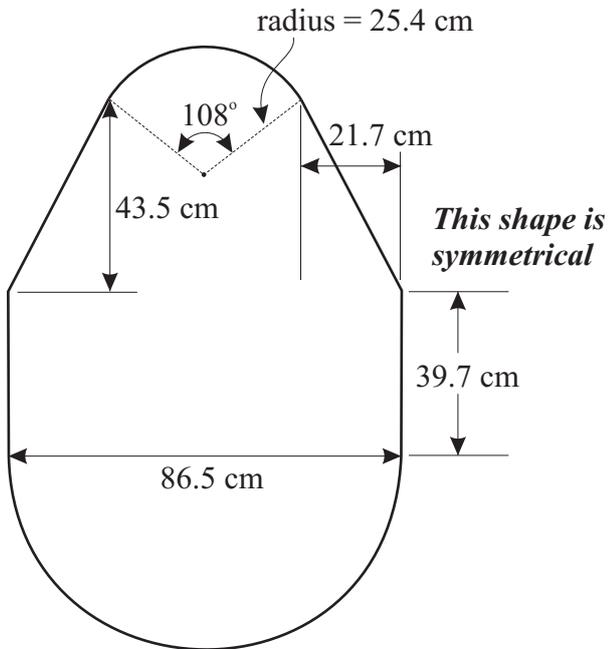


(d)



Name: _____

1. Find the perimeter of the following shape.
Give answer correct to one decimal place.

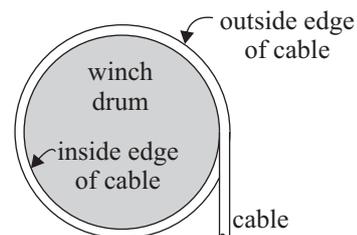


2. Calem wanted to determine the distance to a friend's house. He attached a counter to the front wheel of his bike that counted each revolution of the wheel. The diameter of his bike wheel is 70 cm.

(a) The counter registered 316 revolutions. Calculate the distance, to the nearest metre, between the two houses.

(b) His younger sister decided to attach the counter to her bike to check the distance. If her bike wheel has a diameter of 56 cm, what counter reading should she get?

3. When a cable is wrapped around a winch drum, the outside edge of the cable is longer than the edge closer to the drum of the winch.



Find the difference in length, to the nearest mm, between the inside and outside edges of a cable 10 mm in diameter that is wrapped around a winch drum of 75 cm diameter.

Name: _____

1. Change the following areas to the units shown in the brackets.

(a) 6.3 m^2 (cm^2) (b) 48.7 mm^2 (cm^2)

(c) 0.00056 km^2 (m^2) (d) 0.0065 m^2 (mm^2)

(e) 24.67 cm^2 (mm^2) (f) $45\,700 \text{ mm}^2$ (m^2)

(g) 820 cm^2 (m^2) (h) $670\,000 \text{ m}^2$ (km^2)

2. Convert the following areas to hectares (ha).

(a) $360\,000 \text{ m}^2$ (b) 5.3 km^2

3. A footpath is 78 cm wide and 26 metres long.

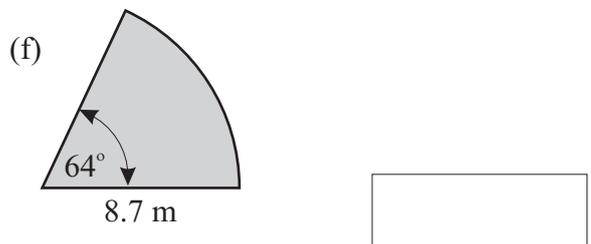
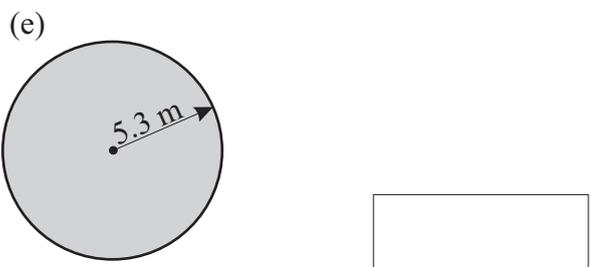
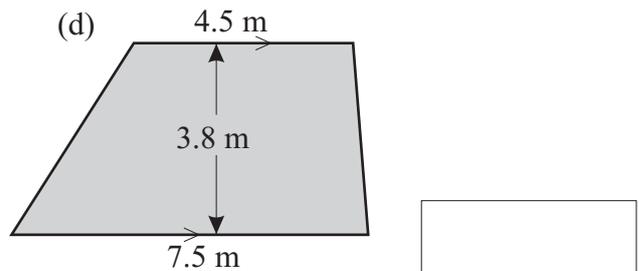
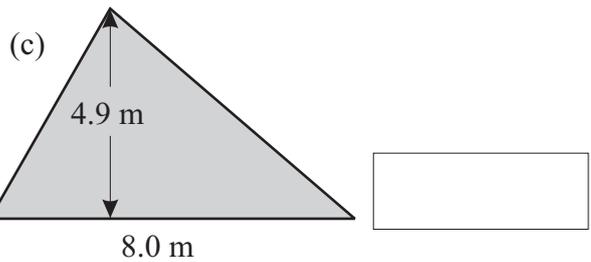
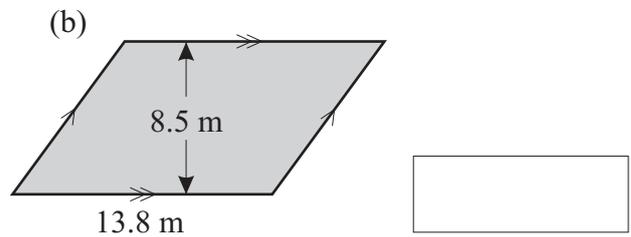
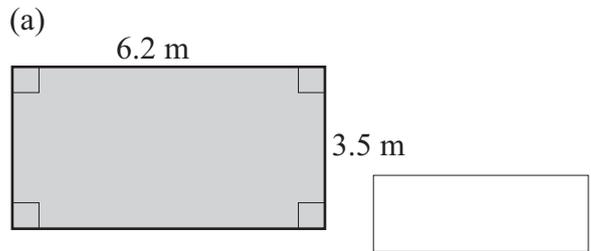
(a) What is the area (in m^2) of the footpath?

(b) How many bricks that are 260 mm long and 130 mm wide would be needed to pave the footpath?

4. A 25 hectare farm is to have an area 500 m long and 100 m wide planted in fruit trees. What percentage of the farm will be fruit trees?

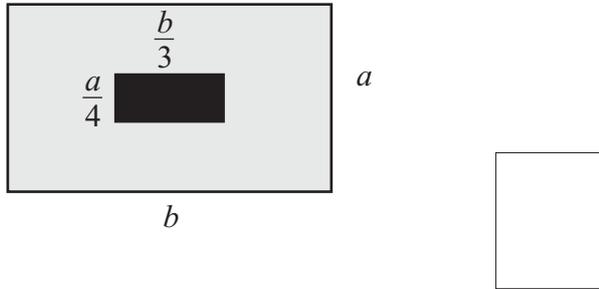
5. Find the area of the following shapes.

Give answers correct to one decimal place.

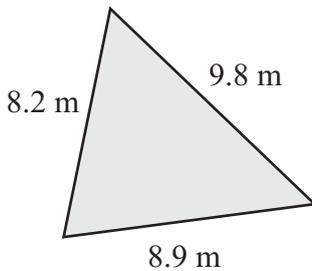


Name: _____

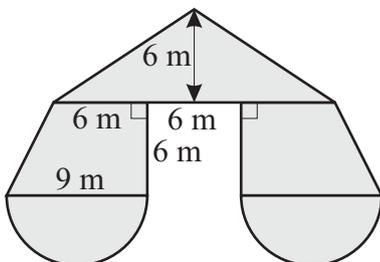
1. What fraction of the larger rectangle below is shaded black?



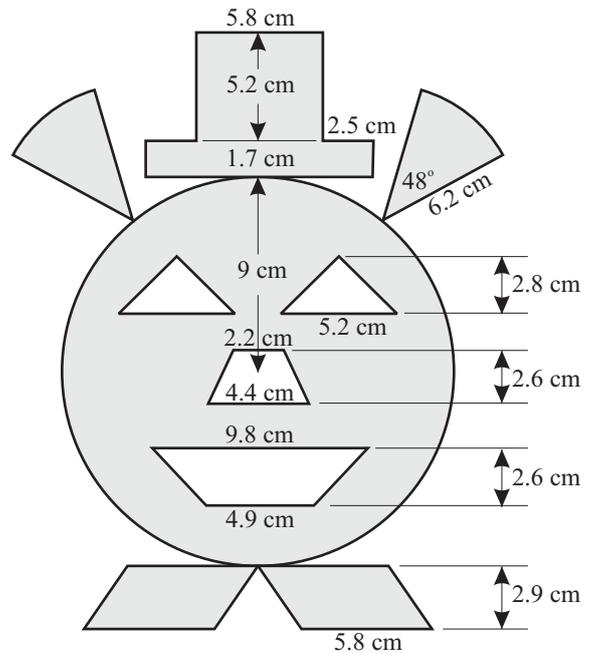
2. Use Hero's Formula to find the area of the triangle below.
Give answer correct to one decimal place.



3. Find the area of the symmetrical shape below.
Give answer correct to one decimal place.



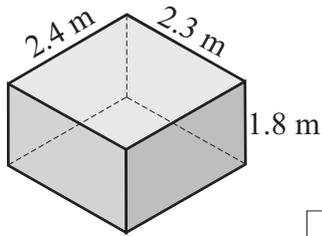
4. Find the area of the shaded region of the symmetrical object shown below.
Give answer correct to one decimal place.



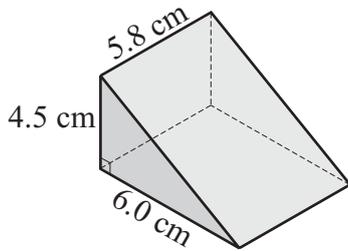
Name: _____

1. Find the total surface area of the following objects.

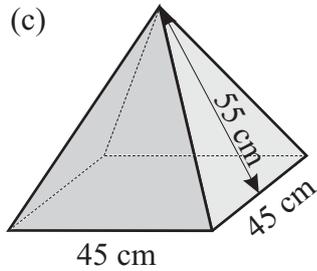
(a)



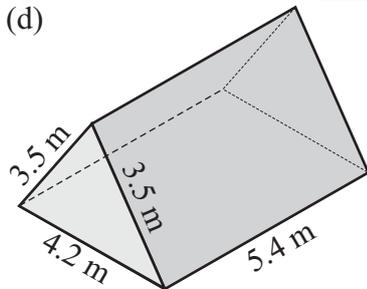
(b)



(c)



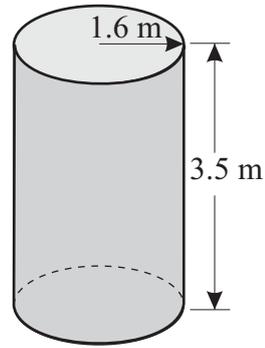
(d)



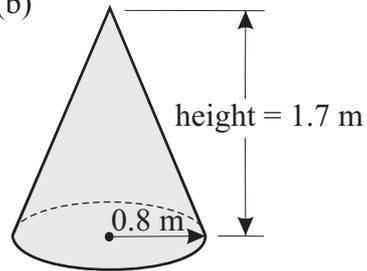
2. Find the total surface area of the following objects.

Give answers correct to one decimal place.

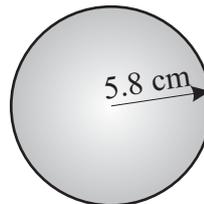
(a)



(b)



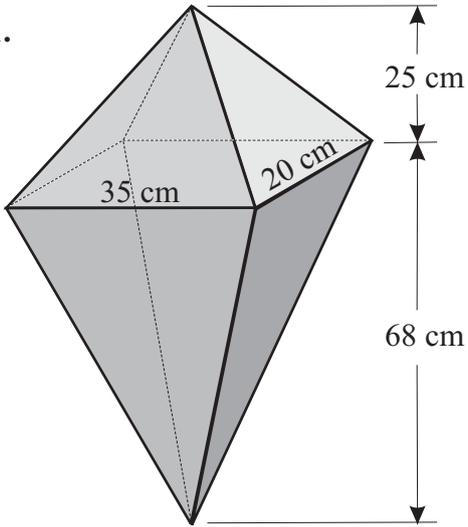
(c)



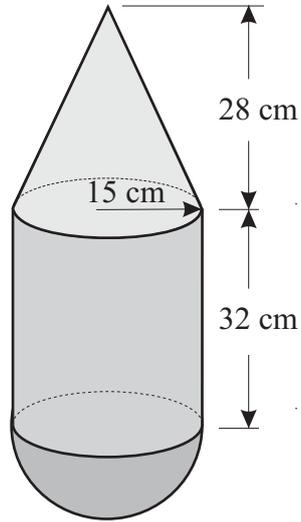
Name: _____

Find the total surface area of these objects .
Give answers correct to one decimal place.

1.



2.



Name: _____

1. Convert the following volumes to the units shown in the brackets.

- (a) 0.05 cm^3 (mm^3) (b) 6.2 L (cm^3)

- (c) 450 cm^3 (L) (d) 5.2 m^3 (L)

- (e) 10 mL (mm^3) (f) 50 mm^3 (cm^3)

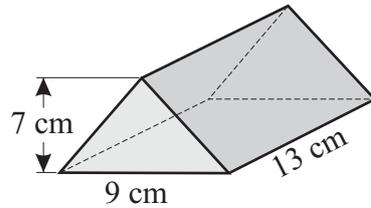
- (g) 120 L (m^3) (h) 85 mL (L)

2. Harry bought a 2 litre bottle of liquid fertilizer. He had to mix eight spoonfuls (each 5 cm^3) of the fertilizer into a 10 litre bucket of water. How many buckets of the fertilizer/water solution could he make?

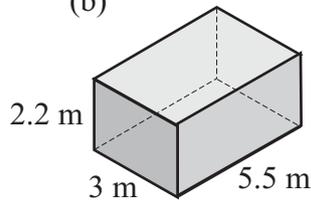
3. A fish tank was 85 cm long, 50 cm wide and 45 cm deep. It is recommended to add water to 5 cm from the top of the tank. Janice is using a 10 litre bucket to fill the tank. How many full buckets will it take to get the water level from empty to 5 cm from the top?

4. Find the volume of the following objects. Give answers correct to one decimal place.

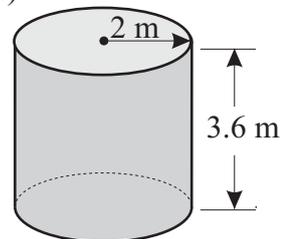
(a)



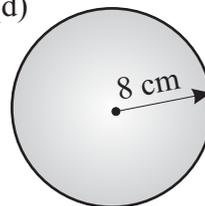
(b)



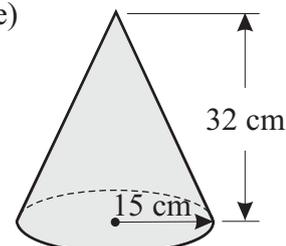
(c)



(d)

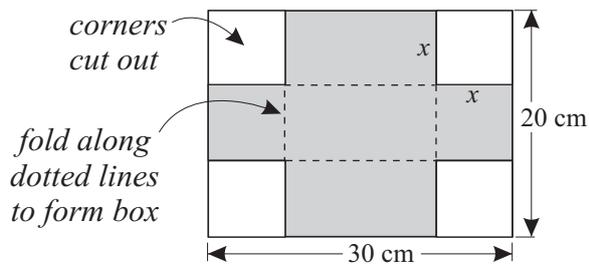


(e)



Name: _____

1. A cardboard box can be made by cutting squares from each of the corners of a rectangular sheet of cardboard.



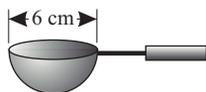
The sheet of cardboard is 30 cm by 20 cm. The side length of the square cut-out is x cm. Using the five different values for x given below, complete the table, showing the length, width and volume of each box that would be formed.

x	Length (cm)	Width (cm)	Volume (cm ³)
2			
3			
4			
5			
6			

By examining the magnitude of the volume for each different value of x , make an estimate of the value of x that would give the largest volume of the formed box.

$x =$

2. The cup of an icecream scoop is in the shape of a hemisphere with a diameter of 6 cm.



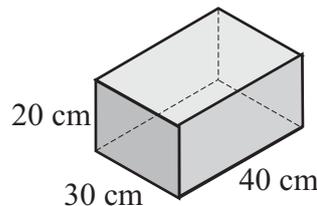
- (a) Find the volume, in cm³, of one level scoop of icecream.
Give answer correct to one decimal place.

- (b) How many level scoops could be taken from a 4 litre tub of icecream?

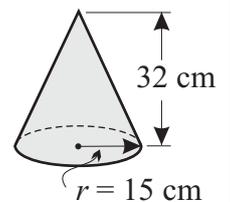
3. A cylindrical preserving jar has an internal diameter of 8 cm and a height of 20 cm.
(a) Calculate the volume, in cm³, of the jar.
Give answer correct to one decimal place.

- (b) Assume an apricot is spherical and has a diameter of 4 cm. If 20 apricots are packed in the jar, how much syrup, in mL, would be required to fill the jar?
Give answer correct to one decimal place.

4. This block of sculptor's clay is moulded into solid cones with the dimensions shown.



Block of clay

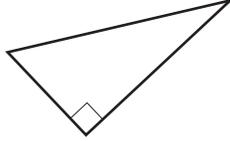


Cone

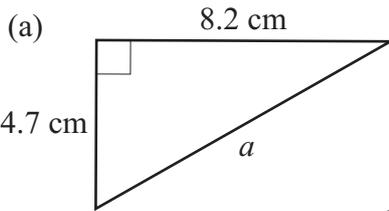
By calculating the volume of the clay and the cone, find the number of cones that would be made from the block.

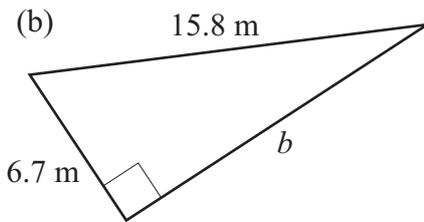
Name: _____

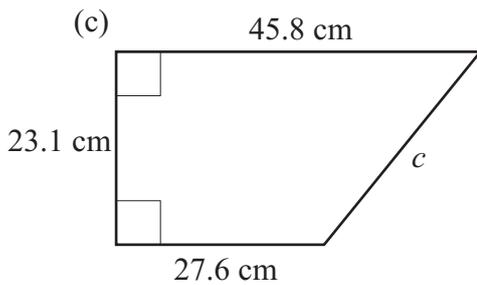
1. Indicate which side of this triangle is the hypotenuse.

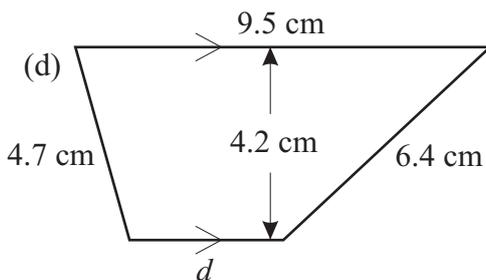


2. Find the unknown lengths.
Give all answers correct to one decimal place.



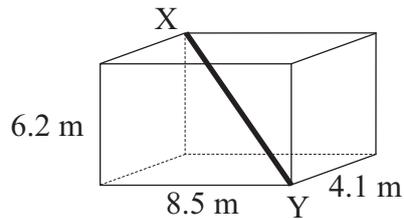




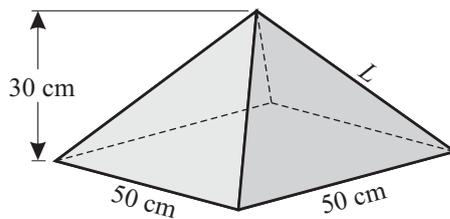


3. A yacht sails from a marina 8.7 km north, then 15.8 km west, then in a straight line back to the marina.
What is the total distance sailed?
Give answer correct to one decimal place.

4. Find the length of the diagonal XY in this cuboid.
Give answer correct to one decimal place.



5. Find the length of the edge, L , shown on the pyramid below.
Give answer correct to the nearest cm.



Master Maths 10 Worksheet 57

Trigonometry 1 - Angles

57

Name: _____

1. Complete the following table converting between degrees and degrees, minutes and seconds.

Decimal Degrees	Degrees, minutes and seconds
8.5°	
23.9°	
0.25°	
34.35°	
66.23°	
45.68°	
71.81°	
39.231°	
84.757°	
	54°24'
	54'
	27°33'
	48°25'30"
	23°35'51"
	67°36"
	82°45'22.32"
	61°33'52.92"
	32°28.44"

2. Convert the following angles from degrees to radians.

Write answer as a:

(i) fraction in its simplest form.

(ii) decimal correct to two decimal places.

(a) 30°

(b) 78°

(i)

(ii)

(i)

(ii)

(c) 210°

(d) 324°

(i)

(ii)

(i)

(ii)

3. Convert the following angles from radians to degrees.

(a) $\frac{3\pi}{10}^\circ$

(b) $\frac{8\pi}{9}^\circ$

4. Convert the following angles from radians to degrees.

Give answers correct to two decimal places.

(a) 0.74°

(b) 2.53°

Name: _____

1. Use a calculator to find the following values correct to four decimal places. (Check calculator is in **DEGREE** mode).

(a) $\tan 37^\circ$ (b) $\sin 56.3^\circ$

(c) $\cos 21^\circ 56'$ (d) $\sin 41^\circ 23' 51''$

(e) $\tan 25^\circ 35' 27.9''$ (f) $\cos 9^\circ 33.2''$

2. Use a calculator to find the following values correct to four decimal places. (Check calculator is in **RADIAN** mode).

(a) $\cos 0.32^\circ$ (b) $\tan 1.38^\circ$

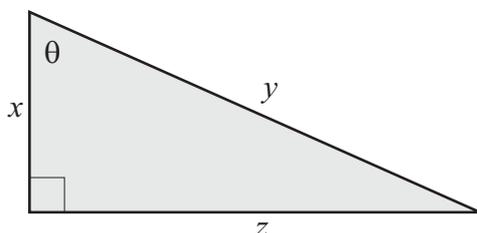
3. Use a calculator to find the following values correct to four decimal places. (Check calculator is in the correct mode).

(a) $\cos 0.54^\circ$ (b) $\tan 28.78^\circ$

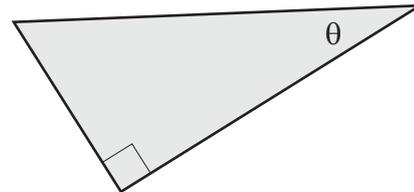
(c) $\sin 15^\circ 24'$ (d) $\cos 1.13^\circ$

4. For the triangle below:

- (a) which side is the hypotenuse?
 (b) which side is opposite angle θ ?
 (c) which side is adjacent to angle θ ?

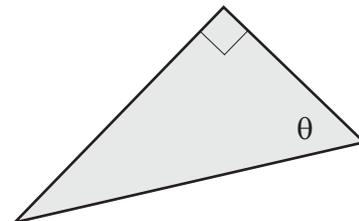


5. On the triangle below label the sides:
 (a) **H** - hypotenuse
 (b) **O** - opposite angle θ
 (c) **A** - adjacent to angle θ



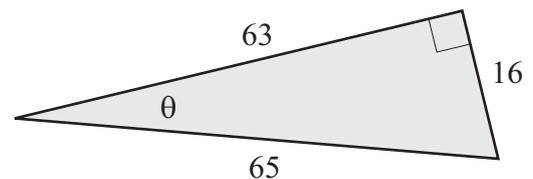
6. For the triangle below the sides are m , n and p . Label the sides given that:

$$\tan \theta = \frac{p}{m}$$



7. For the triangle below find $\sin \theta$, $\cos \theta$ and $\tan \theta$. Give answer as a:

- (i) fraction
 (ii) decimal correct to four decimal places



$\sin \theta$ (i) (ii)

$\cos \theta$ (i) (ii)

$\tan \theta$ (i) (ii)

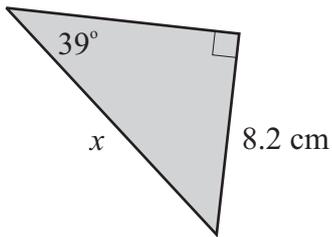
Master Maths 10 Worksheet 59
Trigonometry 3 - Finding Side Lengths 1

59

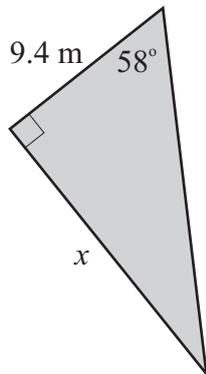
Name: _____

Find the unknown side lengths in the following triangles.
Give answers correct to one decimal place.

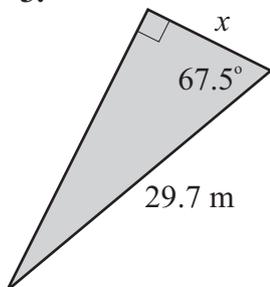
1.



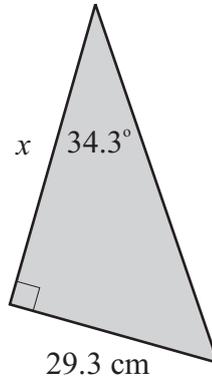
2.



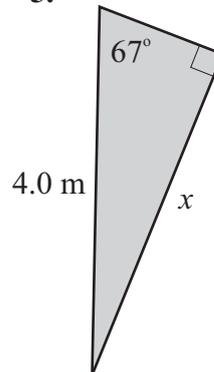
3.



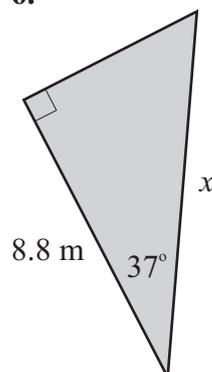
4.



5.



6.

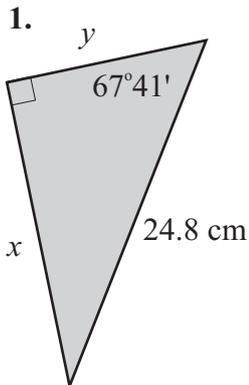


Master Maths 10 Worksheet 60
Trigonometry 4 - Finding Side Lengths 2

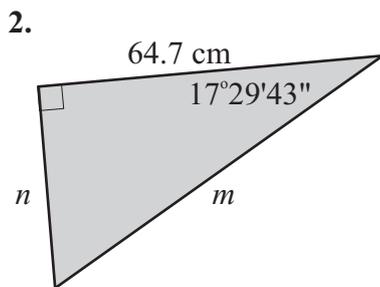
60

Name: _____

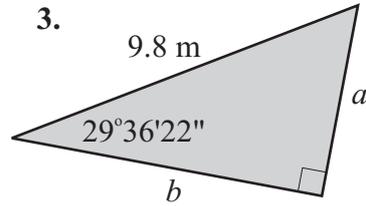
Find the unknown side lengths in the following triangles.
Give answers correct to one decimal place.



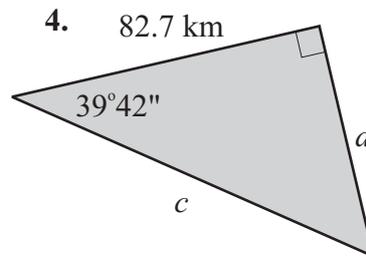
$x =$
$y =$



$m =$
$n =$



$a =$
$b =$



$c =$
$d =$

Name: _____

Give all answers correct to one decimal place

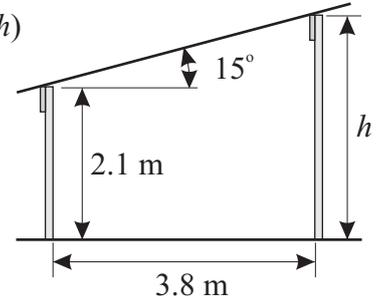
1. A yacht sails 27.8 km in a direction of S 48° W from a marina.
(a) How far south of the marina is the yacht?

- (b) How far west of the marina is the yacht?

2. A hot air balloon floats 26 km in a direction of S $32^\circ 28'$ E from base then 18 km in a direction S $18^\circ 54'$ W.
(a) How far south of the base is the balloon?

- (b) How far east or west of the base is the balloon?

3. Find the height (h) of the wall in the carport shown here.

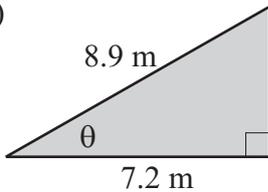


4. James, a photographer, is observing a weather balloon as it ascends. He is standing 150 metres away from the point where the balloon was released. He takes a photo of the balloon with his camera set at an angle of 15° to the horizontal and 10 seconds later at an angle of 27° to the horizontal. At what speed is the balloon rising? Give answer in m/sec correct to one decimal place.

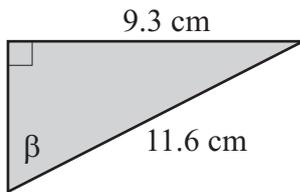
Name: _____

1. Find the unknown angles in the following triangles.
Give answers correct to one decimal place.

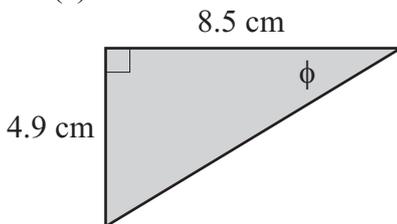
(a)



(b)



(c)



2. Two hikers walk 3.8 km north then 2.5 km east of their camp. What direction do they need to hike in a straight line back to their camp?
Give answer to the nearest degree.

3. The shadow of a 3.7 m pole was measured to be 6.5 m long. Some time later the shadow was measured to be 4.8 m long. What is the change in angle of the Sun's rays in this time?
Give answer in DMS to the nearest second.

4. One end of a 5.6 m plank of timber rests on the ground. The other end rests on bricks 450 mm off the ground. What angle does the plank make with the ground?
Give answer as a decimal to one decimal place.

Master Maths 10 Worksheet 63
Trigonometry 7 - Problem Solving

63

Name: _____

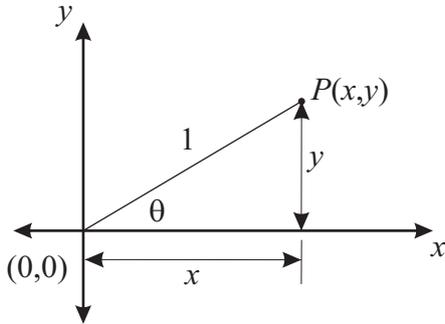
A fishing boat leaves a marina to travel to a favourite fishing spot. The fishermen need to travel 25.6 km in a direction of N $35^{\circ}17'$ W. After travelling 27.2 km the fishermen realise they had travelled in a direction of N $45^{\circ}17'$ W.

1. What direction do they need to travel to proceed in a straight line to the fishing spot?
Give answer to the nearest minute.
2. How far away is the fishing spot?
Give answer correct to one decimal place.

Direction

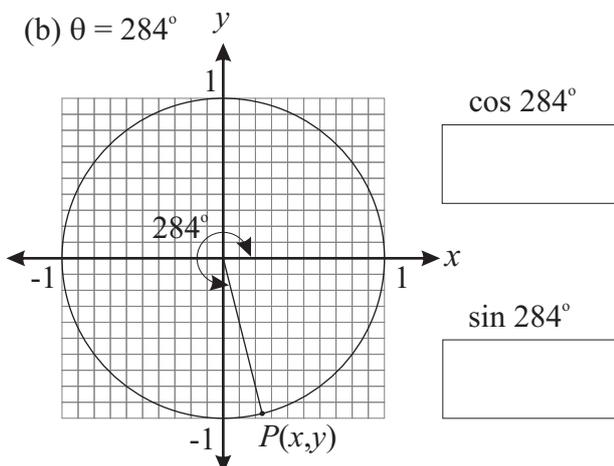
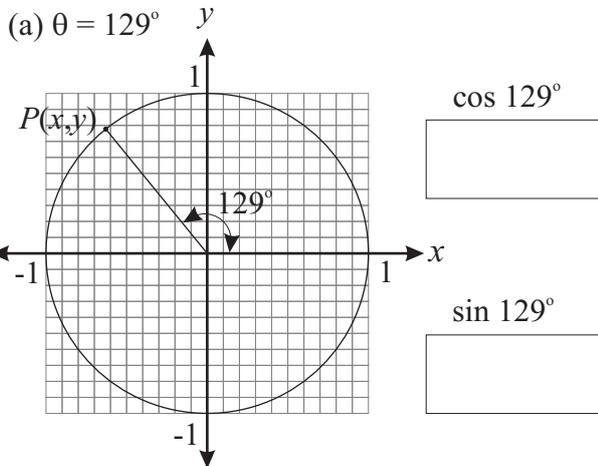
Distance

Name: _____



1. Point P shown above has coordinates (x,y) and is one unit from the origin $(0,0)$. Complete the following with either $\cos \theta$ or $\sin \theta$.
- (a) $x =$ _____ (b) $y =$ _____

2. Use the graphs below to find approximate values (two decimal places) for $\cos \theta$ and $\sin \theta$ of the angles shown.



3. Use a calculator to find the exact values correct to four decimal places.

(a) $\cos 129^\circ$ (b) $\sin 129^\circ$

(c) $\cos 284^\circ$ (d) $\sin 284^\circ$

4. State if the following values would be **positive** or **negative**.

(a) $\cos 210^\circ$ (b) $\sin 327^\circ$

(c) $\cos 83^\circ$ (d) $\sin 196^\circ$

5. Complete the following identities.

(a) $\sin^2 \theta + \cos^2 \theta =$

(b) $\sin \theta = \sqrt{\quad}$

(c) $\tan \theta =$ _____

6. Use these identities to find the following. Give answers correct to four decimal places.

(a) Find $\sin \theta$ if $\cos \theta = 0.4452$

(b) Find $\tan \theta$ if $\cos \theta = 0.4452$

(c) Find $\sin^2 28^\circ + \cos^2 28^\circ$

Name: _____

1. Give an example of statistical data that would be best obtained by:
(a) observation

(b) questionnaire

2. Use an example to explain the difference between *population* and a *sample* when referring to statistical data.

3. A community of 3500 people are to be surveyed. What is the minimum number of people that should be surveyed for the results to be acceptable?

4. There were 23 560 people at a concert. The ages of 200 of these people were recorded and 125 of them were younger than 20.

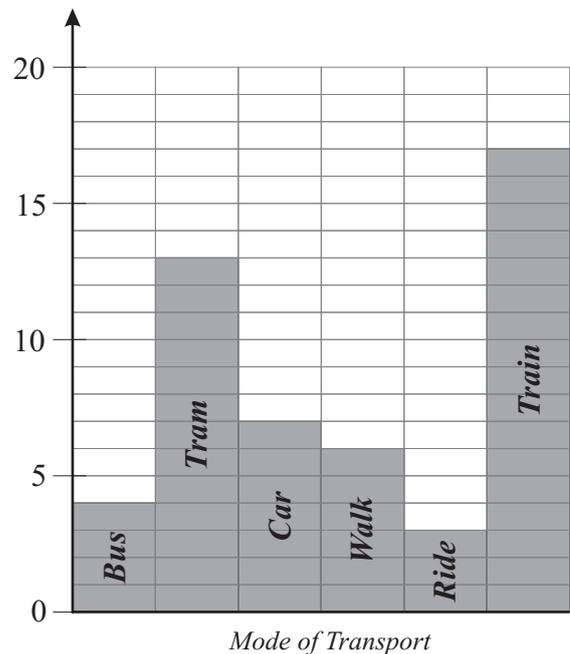
(a) Is this an adequate sample size for statistical purposes?

(b) What percentage of the sample were younger than 20?

(c) Based on these figures, how many of the people at the concert were younger than 20?

5. There were 650 people who worked in a retail store. 50 of the workers were asked what transport they used to get to work each day. The results are shown on the graph below.

Number of People



(a) Based on these figures, how many of the workers in the store used each of the modes of transport to get to work?

Transport	Number
Bus	
Tram	
Car	
Walk	
Ride	
Train	

(b) What percentage of the workers used public transport to get to work?

Name: _____

1. Give an example of each of the following types of data.

(a) *continuous numerical*

(b) *discrete numerical*

(c) *categorical*

2. A number of people were asked the type of transport they used on their last holiday. The tally sheet below shows the results.

Transport to last holiday	Tally
Car	
Aeroplane	
Bus	
Train	
Ship	

(a) How many people were surveyed?

(b) What percentage of the people used each type of transport?
Give answers correct to one decimal place.

Transport to last holiday	Percentage
Car	
Aeroplane	
Bus	
Train	
Ship	

(c) If this information is to be displayed on a pie chart, what angle would be used for each section?
Give answers correct to one decimal place.

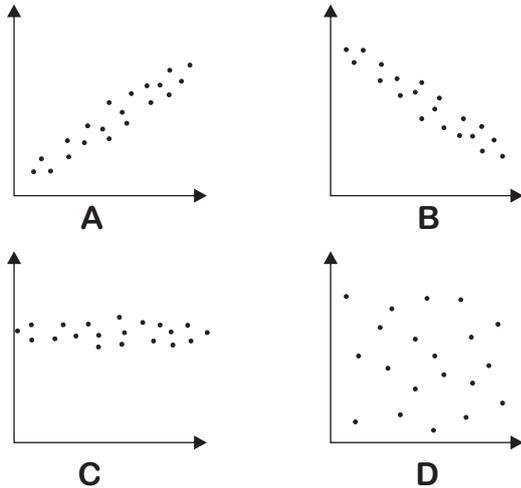
Transport to last holiday	Angle on Pie Chart
Car	
Aeroplane	
Bus	
Train	
Ship	

(d) Complete the column graph below displaying this information.



Name: _____

1. Select one of these four graphs to best illustrate the shape of the graph you would expect as a result of graphing the information shown below (a to k).

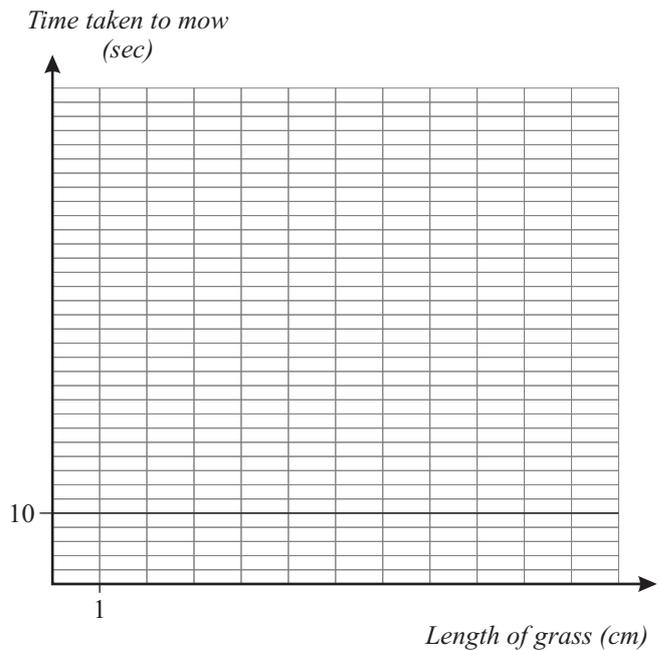


- (a) Amount of money spent on advertising a product versus the sales of the product.
- (b) Time spent watching TV versus time spent on doing homework.
- (c) Police numbers in the state versus amount of crime.
- (d) Amount of fertilizer used by a gardener versus number of flowers produced.
- (e) The age of people versus the number of people wearing spectacles.
- (f) The number of feral cats versus the number of native animals in that area.
- (g) The age of people versus the number of pets they own.
- (h) The daily temperature versus the number of students attending school.
- (i) The number of people wearing seat belts versus the number of road fatalities.
- (j) The amount of money spent on drug education versus the number of drug overdoses.
- (k) The amount of exercise done per week versus a person's standing pulse rate.

2. Jarryd found that the length of the grass in his yard affected the time it took him to mow it. He measured the length of the grass and time it took him to mow it on several occasions and recorded the results. These are shown in the table below.

Length of grass (cm)	3	10	8	5	1
Time taken to mow (minutes)	40	64	57	47	33

(a) Complete the graph below displaying this information



(b) Using this graph, approximately how long would it take Jarryd to mow grass with the following lengths?

- Give answers to the nearest minute.
- (i) 2 cm
 - (ii) 7 cm
 - (iii) 12 cm

(c) Describe how the grass length affects the time to mow it.

Master Maths 10 Worksheet 68

Mean, Mode and Median 1

68

Name: _____

1. Find the mean, mode and median for each of the following sets of numbers.
Give answers correct to one decimal place where appropriate.

(a) 8 10 11 11 12 12 12 14 14 16 18

mean	mode	median

(b) 13 15 16 17 17 17 18 19 20 23 25 28

mean	mode	median

(c) 23 26 19 15 17 28 27 19 14 20 32

mean	mode	median

(d) 24 23 17 21 32 25 35 29 40 44 22 46

mean	mode	median

2. The maximum temperature ($^{\circ}\text{C}$) in a town was recorded each day for two weeks. These temperatures are shown below.

21 25 17 19 27 30 33 20 28 35 39 38 32 22

(a) What is the mean maximum temperature?

(b) What is the median maximum temperature?

3. Find the mean, mode and median for the data shown in this frequency table.
Give answers correct to one decimal place where appropriate.

<i>Value</i> x	<i>Frequency</i> f	<i>Cumulative</i> <i>Frequency</i>
33	5	
34	9	
35	14	
36	11	
37	7	
<i>total (N)</i>		

mean	mode	median

4. Complete the frequency table for the data below and find the mean, mode and median.
Give answers correct to one decimal place where appropriate.

15 16 17 16 18 19 16 17 16 16 16 19 18 17
17 15 16 19 18 15 17 17 18 19 16 15 17 18
16 15 18 17 18 15 16 17 16 18 17 18 17 17

<i>Value</i> x	<i>Frequency</i> f	<i>Cumulative</i> <i>Frequency</i>
<i>total (N)</i>		

mean	mode	median

Master Maths 10 Worksheet 69

Mean, Mode and Median 2

69

Name: _____

The lengths of a number of fish (in cm) are shown below.

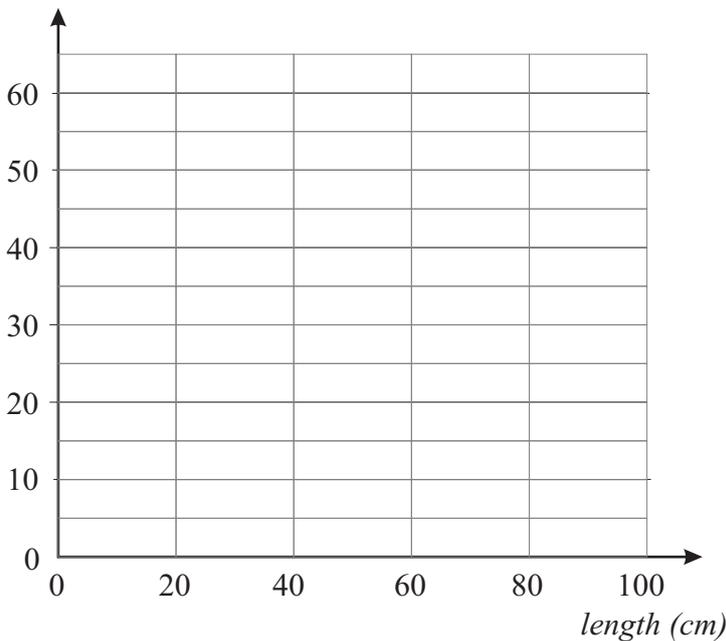
1. Complete the frequency table below.
2. Calculate the mean length from the frequency table.
3. Calculate the mean length from the raw data.
4. Find the modal class.
5. Use the axes shown to draw the cumulative frequency graph.
6. Find an approximate value of the median from the cumulative frequency graph.

15 55 19 54 19 63 21 23 28 74 30 35 70 37 39 40 85 42 54 46 54 46 84 49 17 67 49 50 52 89 90 14
52 43 53 44 56 57 23 58 60 18 61 62 64 66 45 66 33 68 42 69 73 26 65 27 55 78 65 80 82 82 22 83

Length

<i>Class Interval (cm)</i>	<i>Midpoint x</i>	<i>Frequency f</i>	$x \times f$	<i>Cumulative Frequency</i>
0-<20				
20-<40				
40-<60				
60-<80				
80-<100				

cumulative frequency



mean from frequency table

mean from raw data

modal class

median

Master Maths 10 Worksheet 70

Stemplots and Boxplots

70

Name: _____

1. For the following set of data:
 (a) construct a non-ordered stemplot
 (b) construct an ordered stemplot
 (c) find the median

37, 12, 51, 45, 13, 32, 14, 18, 34, 20,
 23, 30, 24, 35, 28, 30, 19, 31, 50, 26,
 33, 43, 23, 34, 16, 38, 40, 42, 27, 51,
 44, 19, 46, 22, 47, 25, 48, 34, 49, 52

(a)

non-ordered stemplot

Stem	Leaf

(b)

ordered stemplot

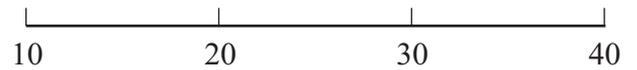
Stem	Leaf

(c)

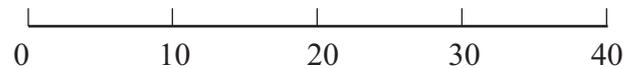
median

2. For the following sets of data construct a boxplot clearly identifying any outliers.

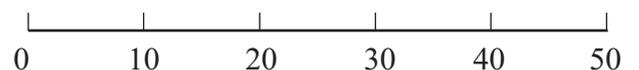
(a) 23, 35, 16, 21, 31, 25, 13, 27, 18, 29, 33



(b) 24, 4, 36, 12, 35, 17, 20, 38, 2, 26, 32, 8



(c) 28, 7, 45, 27, 44, 30, 2, 38, 41, 29



Master Maths 10 Worksheet 71

Probability 1

71

Name: _____

1. Choose which of the following decimal probabilities best describes the outcome descriptions below.

0 0.2 0.7 1

- (a) Event A will most likely occur
- (b) Event B will not occur
- (c) Event C will occur
- (d) Event D will most likely not occur

2. One number is chosen from the following.

4 16 36 9 39 21
24 11 23 28 15 42

Find the following probabilities. Give answers as fractions in their simplest form.

- (a) Pr(the number is even)
- (b) Pr(the number is greater than 30)
- (c) Pr(the number is a multiple of 3)

3. The probability of winning a prize in a raffle was 0.072. What is the probability of not winning a prize?

Give answer as a decimal.

4. There are 120 boxes in a lucky dip. One box has an electronic game, five boxes have movie tickets, 14 boxes have chocolates and the other boxes are empty.

Write the following probabilities as fractions in their simplest form.

(a) What is the probability of the first pick being:

(i) the game? (ii) a chocolate? (iii) a prize?

(b) The first 10 picks are the game, two tickets, three chocolates and four empty boxes.

What is the probability of the next pick being a prize?

5. Tayla propagates seeds from native plants. She obtained 80 seeds of a new variety and found that 65 germinated.

(a) Based on these results, what is the probability that a seed will germinate?

Give answer as:

(i) a fraction in its simplest form

(ii) a decimal

(b) If Tayla collected 560 of these seeds, how many could she expect to germinate?

6. A footballer had 50 kicks at goal. 14 of the kicks missed to the left of the goal, 8 missed to the right and the other kicks were goals.

(a) Based on these figures find the following probabilities as percentages.

(i) Pr(he kicks a goal)

(ii) Pr(he misses to the left)

(iii) Pr(he misses to the right)

(b) If he has an average of 12 kicks at goal each game and plays 24 games, how many goals will he be expected to kick? Give answer to the nearest goal.

7. The population of Coff Bay is 14 000. In one year 450 of the population caught influenza. The population of the neighbouring town of Achey Heads is 7500. In Achey Heads 265 people caught the influenza.

Find the percentage of each town that caught influenza (one decimal place) and state in which town you were more likely to catch it.

Coff Bay	<input style="width: 60px; height: 30px;" type="text"/>	Town more likely to catch influenza
Achey Heads	<input style="width: 60px; height: 30px;" type="text"/>	<input style="width: 150px; height: 30px;" type="text"/>

Master Maths 10 Worksheet 72
Probability 2

72

Name: _____

1. Rosanne has two hats (red and green), three scarves (red, blue and green) and three pairs of gloves (red, blue and green). One cold, dark morning she randomly chose a hat, scarf and pair of gloves from her wardrobe.

(a) Construct a tree diagram showing all the possible combinations.

(b) Find the following probabilities and write them as fractions in their simplest form.

(i) Pr(all items are the same colour)

(ii) Pr(all items are different colours)

(iii) Pr(she chose at least one blue item)

2. There is a game at a sideshow where you place **two** balls into the mouth of a clown.

The clown's head turns from side to side and the balls can drop into any one of the four numbered boxes underneath.

The boxes are numbered 1, 3, 5 and 10.

The two numbers are **multiplied** to determine if a prize is won.



(a) Complete the two-way table below showing all possible outcomes.

The prizes and the scores needed are:

A **soft toy** with a score of **1 or 100**.

A **chocolate** with a score that is an **odd number**.

A **puzzle** with a score that is a **multiple of 5**.

A **poster** with a score that is a **multiple of 3**.

(b) Find the following probabilities and write them as fractions in their simplest form.

(i) Pr(winning a soft toy)

(ii) Pr(winning a chocolate)

(iii) Pr(winning a puzzle)

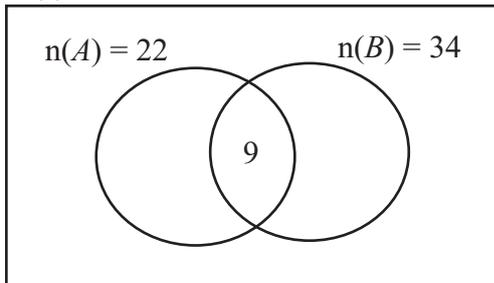
(iv) Pr(winning a poster)

(v) Pr(winning three prizes)

Name: _____

1. (a) Complete the Venn diagram below by stating the number of elements in each region.

$n(\epsilon) = 50$



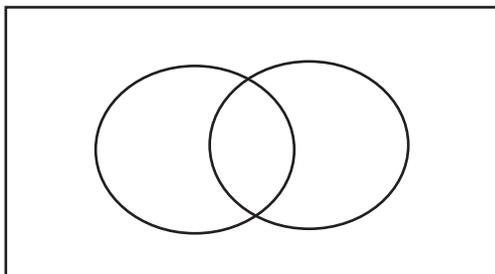
- (b) Find the following probabilities if an element is randomly chosen. Write as fractions in their simplest form.

- (i) $\Pr(A \cap B)$ (ii) $\Pr(A \cup B)$ (iii) $\Pr(B')$

- (iv) $\Pr(A' \cup B')$ (v) $\Pr(A' \cap B)$ (vi) $\Pr(A)$

2. 60 travellers in Europe were asked if they could speak French and/or German. 30 of them could speak French, 24 could speak German and 6 of these could speak both languages.

- (a) Complete the Venn diagram below to display this information.

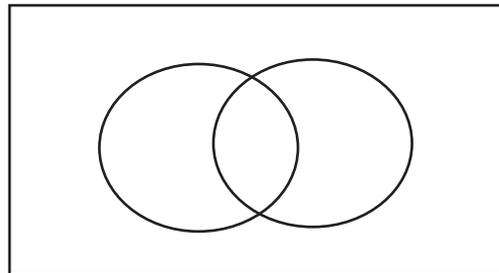


- (b) Based on this information what is the probability of randomly choosing someone who could speak neither French nor German?

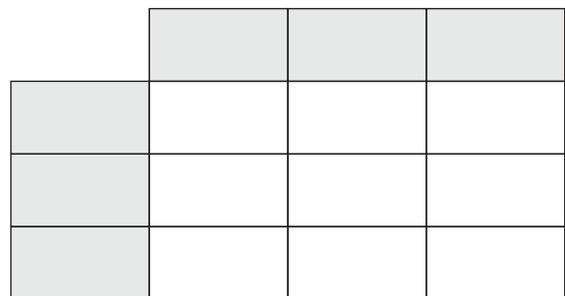
Give answer as a fraction in its simplest form.

3. A shop owner noted that of 100 people who came into her shop, 58 bought milk, 36 bought bread and 22 customers did not buy milk or bread.

- (a) Complete the Venn diagram below to display this information.



- (b) Complete the Karnaugh map below to display the information.



- (c) For a customer entering the shop find the following probabilities.

Give answers as fractions in their simplest form.

- (i) $\Pr(\text{they will buy milk but not bread})$

- (ii) $\Pr(\text{they will buy bread but not milk})$

- (iii) $\Pr(\text{they will buy milk and bread})$

Name: _____

1. A number from 1 to 30 (inclusive) is picked at random. Find the following probabilities as fractions in their simplest form.

(a) Pr(the number is a multiple of 3)

(b) Pr(the number is a multiple of 5)

(c) Pr(the number is a multiple of 3 and 5)

(d) Pr(the number is a multiple of 3 or 5)

2. 60 people were asked if they had been to Asia and/or Europe. 22 had been to Asia, 14 had been to Europe and 6 of these had been to both Asia and Europe.

Based on these figures, if a person is chosen at random, what is the probability that they have been to Asia or Europe?

3. $\Pr(X) = 0.64$, $\Pr(Y) = 0.38$, $\Pr(X \cap Y) = 0.24$

Use this information to find $\Pr(X \cup Y)$.

Write answer as a decimal.

4. Jim and Mark play cricket in the same team. Over a period of time it was calculated that the probability of Jim scoring more than 50 runs in a game was 0.45 and the probability of Mark scoring more than 50 runs in a game was 0.32. The probability of them both scoring more than 50 runs in a game was 0.24. What is the probability that Jim or Mark will score more than 50 runs in a game?

5. A lawn mower repairer found that an average of six out of ten mowers brought in to be repaired needed work on the engine and eight out of ten needed work on the blades. One in two needed work on the engine and blades. Based on these figures, what is the probability that a mower being repaired needed work on the engine or blades?

Give answer as a fraction in its simplest form.

6. Josephine had three pairs of black socks, four pairs of white socks, two pairs of green socks and one pair of purple socks. If she randomly chose a pair of socks from her sock draw, what is the probability it was white or green?

Give answer as a fraction in its simplest form.

7. In the town of Greendale, 85% of the houses are brick and 74% of the houses are insulated. 68% of the houses are both brick and insulated. If a house is chosen at random, what is the probability (as a percentage) that it is brick or insulated?

Name: _____

1. A bag contains twenty balls numbered 1-20. A ball is chosen, replaced and another chosen. Find the following probabilities and write as fractions in their simplest form.

(a) Pr(both balls are even numbers)

(b) Pr(both balls are less than 5)

2. In the Slammers basketball team there are eight players - three of them left-handed. In the Jumpers basketball team there are nine players - four of them left-handed. A player is randomly chosen from each team. Find the following probabilities and write as fractions in their simplest form.

(a) Pr(both chosen players are left-handed)

(b) Pr(both chosen players are right-handed)

3. On any school day the probability of Kylie getting Mathematics homework is 0.8, English homework is 0.7 and homework in another subject is 0.9. Find the following probabilities giving answers as decimals.

(a) Pr(homework in only Mathematics on Monday)

(b) Pr(homework in Mathematics, English and another subject on Tuesday)

(c) Pr(no homework on Wednesday)

(d) Pr(getting homework in only Mathematics and English on Thursday and Friday)

4. A round of football had eight games. Chrissie is in a tipping competition and for one round asks her dog, Bob, to pick the winners. What is the probability that Bob picks all eight winners? Give answer as a fraction.

5. Hervey's guinea-pig had six babies - four of them males. He picks two at random to give to a friend. Find the following probabilities and write as fractions in their simplest form.

(a) Pr(both are males)

(b) Pr(both are females)

6. In a year 10 class there are 12 boys and 12 girls. Three are chosen at random to help the teacher. Find the probability that all three are girls and write as a fraction in its simplest form.

7. In another year 10 class there are 16 boys and 10 girls. Three are chosen at random from this class. Find the following probabilities writing answers as fractions in their simplest form.

(a) Pr(all three are boys)

(b) Pr(all three are girls)

(c) Pr(the first chosen is a boy and the next two are girls)

Name: _____

1. A farmer had three water bores drilled on his farm. He was told the probability of water being found in any of the bores was 0.6.
- (a) Draw a tree diagram to show all possible outcomes and the probabilities of the water bores having water (W) or being dry (D).

(b) Find the following probabilities giving answers as decimals.

- (i) Pr(water is found in all three bores)

- (ii) Pr(water is found in at least one bore)

- (iii) Pr(none of the bores have water)

2. A music festival was organised to be held on a long weekend (three days) in April at Rock Bay. On average it rains six days in April in Rock Bay.

- (a) What is the probability that it rains on a particular day in Rock Bay in April?

Give answer as a fraction in its simplest form.

- (b) Draw a tree diagram to show all possible outcomes and the probabilities of rain occurring on any of the three days of the music festival.

(b) Find the following probabilities. Give answers as fractions in their simplest form.

- (i) Pr(it rains on all three days)

- (ii) Pr(it rains on more than one day)

- (iii) Pr(there is no rain for the three days)