4 Integers 1

A Negative Numbers

Integers are whole numbers on either side of zero, including zero itself. -2 means '2 below zero'.

← negative numbers —|— positive numbers →

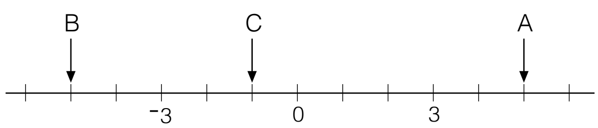
-5 -4 -3 -2 -1 0 1 2 3 4 5 6 7

On the numberline a number is larger than any number on its left and smaller than any number on its right.

Example : Order these from smallest to largest : -8, 2, 6, -4.

Answer : -8, -4, 2, 6.

1



Write down the integer.

a) at A ………… b) at B ………… c) at C …………

2 Circle the larger of the two numbers.

a) -3 4 b) 0 -2 c) 2 -5

3 Order these from smallest to largest.

a) 0, -5, 6, -8 ……………………………………………

b) -100, 200, -500 ……………………………………………

4 The temperature in Wanaka on Tuesday at 6 pm was 3°C. By midnight the temperature had dropped 4 degrees.

a) What was the temperature at midnight?

……………………………………………………………………

b) After midnight the temperature dropped another 2 degrees before it went up by 10 degrees, reaching the highest temperature on Wednesday at 2 pm. What was the highest temperature on Wednesday?

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B Adding and Subtracting

Adding a positive number makes the original number larger.
Adding a negative number makes the original number smaller.

Example : Work these out by moving on the numberline.

a) 2 + 5 b) -3 + 4 c) 3 + -2 d) -4 + -3

-7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9

Working : a) 2 + 5 means start at 2, go up 5, answer 7
b) -3 + 4 means start at -3, go up 4, answer 1
c) 3 + -2 means start at 3, go down 2, answer 1
d) -4 + -3 means start at -4, go down 3, answer -7

1 Work out.

a) 3 + 6 ……………… b) -4 + 5 ………………

c) -6 + 1 ……………… d) 2 + 4 ………………

e) 5 + -2 ……………… f) -7 + -1 ………………

g) -2 + 8 ……………… h) -3 + -2 ………………

i) 9 + -5 ……………… j) -8 + 8 ………………

Subtracting a positive number makes the original number smaller.
Subtracting a negative number makes the original number larger.

Example : Work these out by moving on the numberline.

a) 6 - 8 b) -2 - 1 c) 3 - -2 d) -2 - -5

-7 -6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6 7 8 9

Working : a) 6 - 8 means start at 6, go down 8, answer -2
b) -2 - 1 means start at -2, go down 1, answer -3
c) 3 - -2 means start at 3, go up 2, answer 5
d) -2 - -5 means start at -2, go up 5, answer 3

2 Work out.

a) 9 - 5 ……………… b) 2 - 8 ………………

c) -3 - 5 ……………… d) -1 - 3 ………………

e) 2 - -2 ……………… f) 5 - -6 ………………

g) -1 - -3 ……………… h) -4 - -4 ………………

i) -2 - 8 ……………… j) 6 - 7 ………………

3 Altogether now. Work these out.

a) 8 + -4 ……………… b) -5 - 4 ………………

c) -9 + 6 ……………… d) 10 - 8 ………………

e) 3 - -7 ……………… f) -2 + 10 ………………

g) -8 - -2 ……………… h) 0 + 6 ………………

i) 4 + -7 ……………… j) 2 - 9 ………………

A Fraction ⟷ Decimal

Example : Write $\frac{3}{4}$ as a decimal number.

Working : $\frac{3}{4}$ can mean three quarters, but also, three divided by four.

Use a calculator [3] [÷] [4] [=] 0.75

Answer : $\frac{3}{4} = 0.75$

1 Write these fractions as decimal numbers.

a) $\frac{1}{5}$ .... b) $\frac{7}{10}$ ....

c) $\frac{3}{8}$ .... d) $\frac{35}{100}$ ....

e) $\frac{9}{25}$ .... f) $\frac{13}{20}$ ....

When converting a fraction to a decimal we can end up with a screen full of digits. This pattern of digits will repeat indefinitely, we call it a **recurring decimal**.

This is how we write recurring decimals :

Examples : $\frac{1}{3}$ = [1] [÷] [3] [=] [0.3333 . . .] $= 0.\bar{3}$

$\frac{1}{27}$ = [1] [÷] [27] [=] [0.037037 . . .] $= 0.\overline{037}$

$\frac{7}{22}$ = [7] [÷] [22] [=] [0.31818 . . .] $= 0.3\overline{18}$

2 Write each fraction as a recurring decimal.

a) $\frac{2}{3}$ .... b) $\frac{7}{9}$ ....

c) $\frac{4}{27}$ .... d) $\frac{14}{11}$ ....

e) $\frac{5}{24}$ .... f) $\frac{5}{44}$ ....

To convert a decimal to a fraction we must remember how to read decimals. For instance, 0.45 can be read as forty-five hundredths.

$0.45 = \frac{45}{100} = \frac{9}{20}$

[0.45 can also be read as 4 tenths and 5 hundredths.

$0.45 = \frac{4}{10} + \frac{5}{100} = \frac{40}{100} + \frac{5}{100} = \frac{45}{100} = \frac{9}{20}$]

3 Write these decimals as fractions in simplest form.

a) 0.8 ....

b) 0.05 ....

c) 0.16 ....

d) 0.125 ....

e) 0.068 ....

B Use the Calculator

We can order fractions by writing them all in decimal form.

Example : Order from smallest to largest $\frac{2}{3}, \frac{3}{5}, \frac{5}{8}, \frac{4}{7}$.

Working : Decimal form: 0.666, 0.6, 0.625, 0.571.
(4) (2) (3) (1)

Order : $\frac{4}{7}, \frac{3}{5}, \frac{5}{8}, \frac{2}{3}$.

1 Circle the largest of these pairs.

a) $\frac{3}{8}$ $\frac{7}{18}$ ....

b) $\frac{17}{23}$ $\frac{2}{3}$ ....

c) $\frac{5}{11}$ $\frac{9}{20}$ ....

2 Order these from smallest to largest.

a) $\frac{3}{8}, \frac{1}{3}, \frac{2}{7}, \frac{3}{10}$ ....

....

b) $\frac{7}{8}, \frac{8}{9}, \frac{11}{13}, \frac{9}{11}$ ....

....

c) $2\frac{3}{4}, \frac{18}{7}, 2\frac{4}{5}, \frac{34}{15}$ ....

....

3 Grandma has bought a large number of identical balls of wool. She finds that 5 balls of wool are needed to make 4 socks and that 9 balls of wool are needed to make 7 hats.

a) How much wool - as a fraction of a complete ball - does grandma need to make . . .

i) 1 sock? ....

ii) 1 hat? ....

b) Which garment needs more wool, a sock or a hat? First use a mental strategy to work his out, then check with a calculator.

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....

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32 Simplifying Multiplications

A The Long and the Short of It

Guidelines for Simplifying Multiplications :

- multiply numbers.
- place number in front of letters.
- place letters in alphabetical order.
- leave out the times sign (x).

It is often a good idea to write a multiplication in long form first, then combine the terms to write the shortest possible expression

Examples : Simplify

a) $4y \times 3$ b) $5b \times 2a$ c) $3pr \times 2q$

Working :
a) $4y \times 3 = 4 \times y \times 3 = 12y$
b) $5b \times 2a = 5 \times b \times 2 \times a = 10ab$
c) $3pr \times 2q = 3 \times p \times r \times 2 \times q = 6pqr$

1 Write these in long form first, then simplify.

a) $6p \times 5$ ....

b) $8 \times 2w$ ....

c) $2a \times 6$ ....

d) $4 \times 2y$ ....

e) $0 \times 3z$ ....

2a) $3z \times 5w$ ....

b) $3a \times 6b$ ....

c) $4y \times 4z$ ....

d) $ab \times 4c$ ....

e) $ac \times 2bd$ ....

Remember how to multiply integers :

pos x pos = pos neg x pos = neg
neg x neg = pos pos x neg = neg

Examples : Simplify. a) $^-4a \times 5b$ b) $^-2q \times {}^-3pr$

Working :
a) $^-4a \times 5b = {}^-4 \times a \times 5 \times b = {}^-20ab$
b) $^-2q \times {}^-3pr = {}^-2 \times q \times {}^-3 \times p \times r = 6pqr$
Note : ^-a means ^-1a

3 Write these in long form first, then simplify.

a) $^-4b \times 2a$ ....

b) $6p \times {}^-3$ ....

c) $^-2w \times {}^-5y$ ....

d) $^-a \times 3b$ ....

e) $2z \times {}^-3w \times 4y$ ....

....

B Lots of Letters

Examples : Simplify

a) $2a \times 5a$ b) $2a^2 \times {}^-4a$ c) $ab^2 \times 3a$

Working :
a) $2a \times 5a = 2 \times a \times 5 \times a = 10a^2$
b) $2a^2 \times {}^-4a = 2 \times a \times a \times {}^-4 \times a = {}^-8a^3$
c) $ab^2 \times 3a = a \times b \times b \times 3 \times a = 3a^2b^2$

1 Simplify.

a) $4p \times 5p$ ....

b) $q^3 \times q^4$ ....

c) $y^2 \times 3y$ ....

d) $2yz \times 3z$ ....

e) $2p^3 \times p$ ....

f) $2a^2 \times 3a^3$ ....

....

g) $2ab^2 \times 2a^2b$ ....

....

h) $3q^2r \times 7r^3$ ....

....

2 Simplify.

a) $^-2a \times {}^-3a$ ....

b) $4p^2 \times {}^-2$ ....

c) $^-y \times 3y$ ....

d) $b^2c \times {}^-c$ ....

e) $^-2q^3 \times 5q$ ....

f) $^-6ab \times {}^-3a$ ....

3 Simplify these without writing the long form first.

a) $a^3 \times a^2$ .... b) $p^5 \times p$ ....

c) $2y \times {}^-3$ .... d) $ab \times a$ ....

e) $^-2b \times {}^-3b$ .... f) $c^2 \times 2ac$ ....

g) $^-a \times {}^-a$ .... h) $3pq \times 4p$ ....

i) $y^5 \times y^5$ .... j) $3a^3 \times 4a^4$ ....

k) $ab^2 \times bc^2$ .... l) $^-2p^2 \times {}^-p$ ....

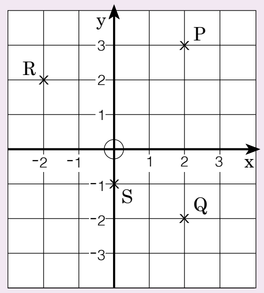
A Points on a Grid

A **cartesian plane** is a grid with two axes.

The horizontal axis is called **x-axis**,

the vertical axis is called **y-axis**, the intersection is called the **origin**.

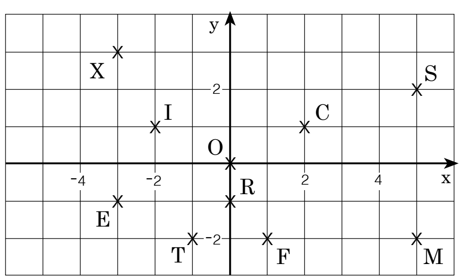
Each point in this plane is defined by a pair of numbers known as its **coordinates**.



Example :

Point P has x coordinate 2 and y coordinate 3.
In short P is at (2, 3).
Q is at (2, −2), R is at (−2. 2), and S at (0, −1).
The origin is at (0, 0).

1



Write the coordinates under each letter.

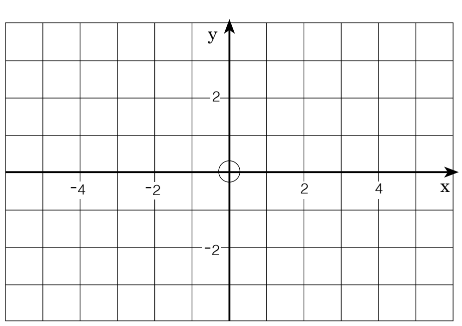
X C O M E S

(…−3, …3.) (….., …..)(….., …..)(….., …..)(….., …..)(….., …..)

F I R S T

(….., …..)(….., …..)(….., …..)(….., …..)(….., …..)

2



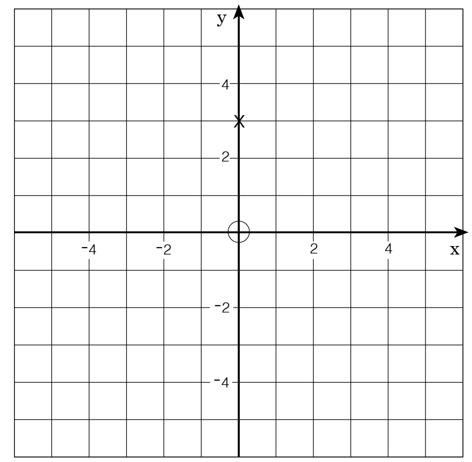
a) Plot A at (4, 2), B at (1, −1), C at (0, 3).
Draw triangle ABC.

b) Plot P at (−5, 1), Q at (−5, −2), R at (−1, −2).
Plot another point, S, such that PQRS is a rectangle.

The coordinates of S are (………, ………)

B Hidden Pictures

1

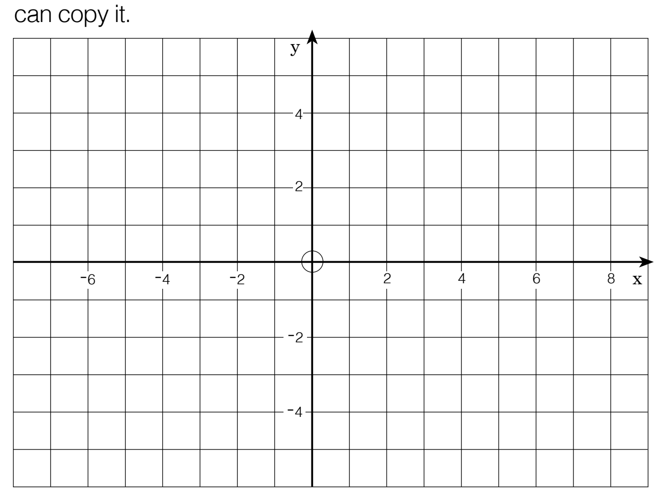


We will draw a bat by connecting points.

Start at (0, 3) and connect this with (−2, 4), then to (−1, 3), (−2, 2), (−3, 3), (−2, 1), (0, 1), (0, 3), (−1, 6), (5, 5), (2, 4), (3, 3), (2, 3), (2, 2), ($\frac{1}{2}$, 2), (1, 1), (1, 0), (0, −1), (−2, 0), (−2, −1), (−3, −1), (−3, −3), (−4, −1), (−5, −4), (−5, 2), (−2, 1).

Draw a face for the bat.

2 Draw your own picture. Write instructions so somebody else can copy it.



Start at (……, ……), connect with (……, ……), (……, ……), (……, ……), (……, ……), (……, ……), (……, ……),

…………………………………………………………………

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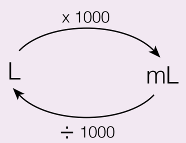
60 Unit Conversion

A Conversion Diagram

Diagram for converting units of volume.



To convert from L to mL multiply by 1000.

To convert from mL to L divide by 1000.

Examples : 3.5 L = 3500 mL (3.5 x 1000 = 3500)
870 mL = 0.87 L (870 ÷ 1000 = 0.87)

1 Convert.

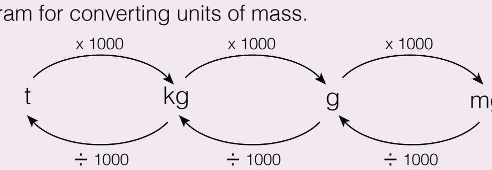
a) 6 L = ... mL b) 4.8 L = ... mL

c) 10.5 L = ... mL d) 0.32 L = ... mL

e) 8000 mL = ... L f) 2600 mL = ... L

g) 1950 mL = ... L h) 740 mL = ... L

Diagram for converting units of mass.



Examples : 50 kg = 50 000 g, (50 x 1000)
85 mg = 0.085 g, (85 ÷ 1000)

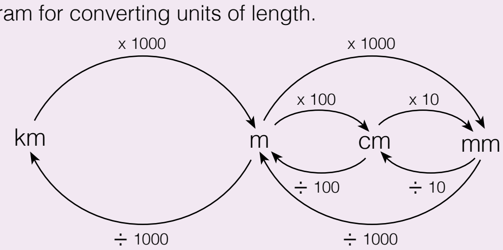
2 Convert to the unit shown.

a) 83 t = ... kg b) 2.4 g = ... mg

c) 0.75 kg = ... g d) 9000 kg ... = ... t

e) 500 g = ... kg f) 680 mg = ... g

Diagram for converting units of length.



Examples : 45 mm = 4.5 cm, (45 ÷ 10)
0.6 m = 60 cm, (0.6 x 100)

3 Convert to the unit shown.

a) 96 cm = ... mm b) 4.8 m = ... cm

c) 8.5 km = ... m d) 0.04 m = ... mm

e) 607 cm = ... m f) 1800 m = ... km

g) 450 mm = ... m h) 75 mm = ... cm

B Solving Problems

In measurement problems there are situations where units have to be changed.

Example : A box contains 65 full cotton reels. Each reel weighs 28 g, the empty box weighs 150 g. Work out the total weight of the box with reels, giving your answer in kg.

Working : 65 x 28 g = 1820 g; 1820 g + 150 g = 1970 g

Answer : 1.97 kg

1 Wayne's drinking bottle can hold 600 mL of water. Wayne drinks 2 of these bottles every day of the working week and 3 each day of the weekend. How many litres of water does Wayne drink per year? (a year has 52 weeks).

....

....

2 A cardboard box is filled with tins of peaches as shown. Each tin of peaches weighs 260 g (this includes the tin). The box weighs 80 g.

a) Calculate the weight of the cardboard box filled with tins, give your answer in kg.

....

....

b) A shipping container takes a load of 1500 boxes of peaches. Calculate the weight of this load in tonnes.

....

....

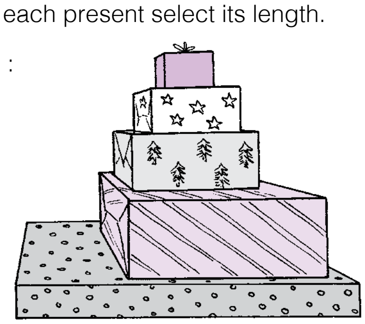
3 Work out. a) 3.5 km + 500 m = ... km

b) 53.8 cm + 25 mm = ... cm

c) 1 L − 220 mL = ... mL

4 Amy's Christmas presents are stacked from longest to shortest. For each present select its length.

Choose from :
1.2 m
54 cm
0.8 m
0.36 m
and 78 mm



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A Thinking About Transformations

1 Dylan says, *'In all four transformations objects and image are congruent.'* Do you agree? Give a reason.

....

....

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2 Esther says, *"Performing a translation is easy, I select just one point of the object, P, and find its image P^{I}. Then I copy the shape in its new position."*

Can you think of a fast way of performing an enlargement?

....

....

....

3a) An object is reflected in mirrorline m. Point B and its reflection B^{I} are exactly the same point. What does this tell you about point B?

....

b) A triangle is rotated about centre C. One vertex stays in exactly the same place. What does this tell you?

....

4 Triangle ABC and its image, triangle $A^{I}B^{I}C^{I}$, are at exactly the same position. Give details of 3 transformations for which this would be possible.

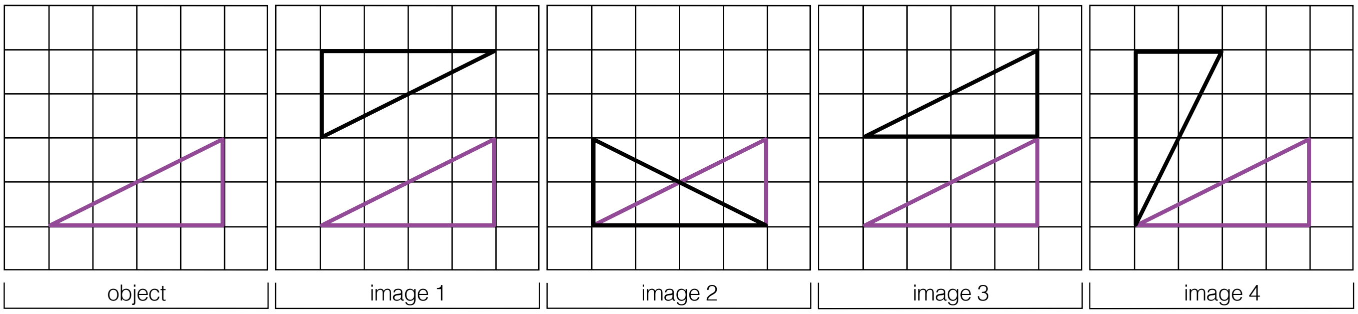
i) ....

ii) ....

iii) ....

B One Object - Four Images

1



Four different transformations have been performed on the purple triangle. For each image write down the type of transformation and give the details.

a) image 1 is the result of ....

b) image 2 is the result of ....

c) image 3 is the result of ....

d) image 4 is the result of ....

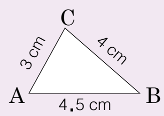
Compass, Protractor and Ruler

A Construct and Measure

A **construction** is useful to find lengths of unknown sides or sizes of unknown angles.

Examples :

a) Construct an exact diagram of triangle ABC. Measure ∠C.



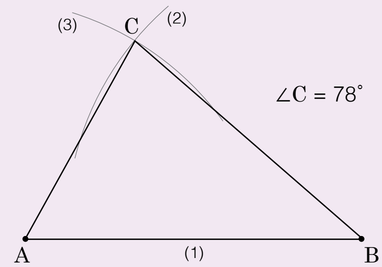
Working :

(1) Draw $\overline{AB}$ 4.5 cm.

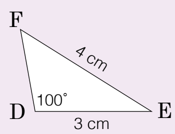
(2) With a compass set at 4 cm and the point in B, draw a long arc.

(3) With a compass set at 3 cm and the point in A, draw another arc which crosses the first.

(4) Where the arcs cross is corner C of the triangle. Join C with A and B. Now measure ∠C with your protractor.



b) Construct a diagram of triangle ABC. Measure side $\overline{DF}$.

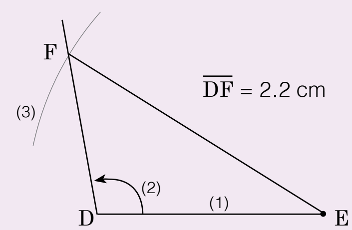


(1) Draw $\overline{DE}$ 3 cm.

(2) With a protractor measure out an angle of 100° in D, draw the second arm any length.

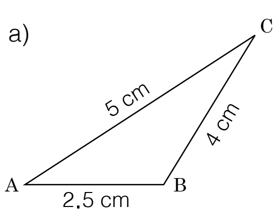
(3) With a compass set at 4 cm and the point in E, draw an arc which intersects the arm.

(4) The crossing is corner F. Form triangle DEF. Now measure side $\overline{DF}$ with your ruler.



1 Construct exact diagrams in the space below, then take measurements as required.

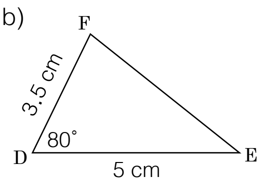
a)



Measure ∠B.

∠B = ...

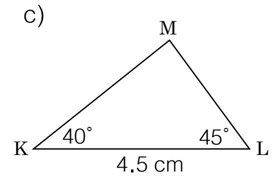
b)



Measure side $\overline{EF}$.

$\overline{EF}$ = ...

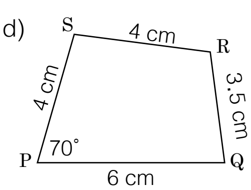
c)



Measure side $\overline{KM}$.

$\overline{KM}$ = ...

d)



Measure ∠R.

∠R = ...

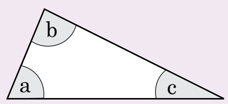
A

D

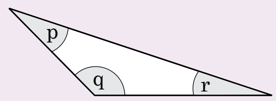
K

P

A Inside a Triangle



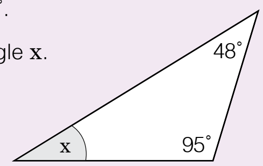
$a + b + c = 180°$



$p + q + r = 180°$

Angle Rule 7
Angles **inside** a triangle add to 180˚.

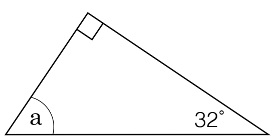
Example : Calculate the size of angle x.



Working :

$x + 48 + 95 = 180°$
$x = 180° - 48 - 95 = 37°$

1 Calculate the size of angle a.



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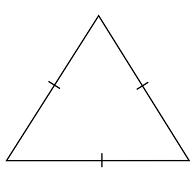
2 

This is an equilateral triangle.
Calculate the size of its angles.

....

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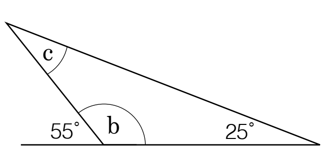
3 Think of other rules as well when you calculate angles b to e.



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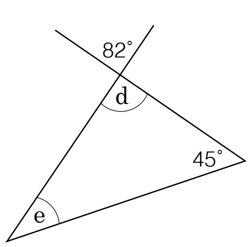

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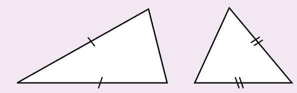
B isosceles Triangles

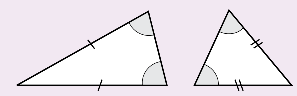
An **isosceles triangle** has two equal sides and also two equal angles called base angles.

Angle Rule 8
Base angles in an isosceles triangle are equal.

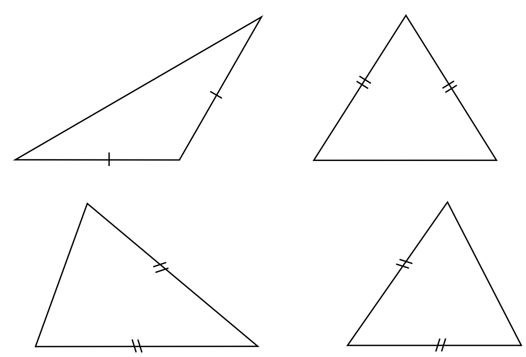
Example :
Colour the equal base angles in these isosceles triangles.



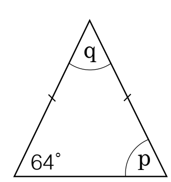
Working :
The base angles are opposite the equal sides.



1 Colour the base angles in these isosceles triangles.



2 Calculate the size of angles p, q, r and s.
Complete the reasoning.



p = ..., because

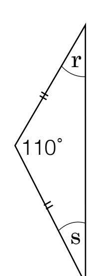
....

....

q = ..., because

....

....



r and s together must be

..........................., because

....

....

Then r = ..., s = ...,

because ....

....

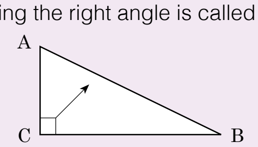
Checking Pythagoras' Rule

A The Hypotenuse

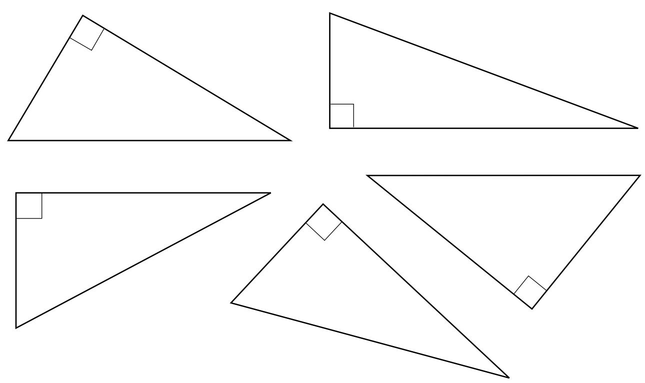
In a right angled triangle, the side facing the right angle is called the **hypotenuse**.

Example : In Δ ABC, which side is the hypotenuse?

Answer : Side $\overline{AB}$.



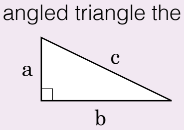
1 In each of these triangles colour the hypotenuse red.



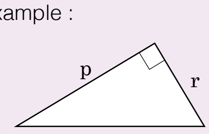
2 Lucy says, "The hypotenuse is the longest side of a right angled triangle." Check Lucy's statement by measuring the right angled triangles above.

Do you agree with Lucy? ....

Pythagoras was a mathematician who lived 2000 years ago in Greece. He discovered that in every right angled triangle the square of the hypotenuse equals the sum of the squares of the other two sides, or $c^2 = a^2 + b^2$.



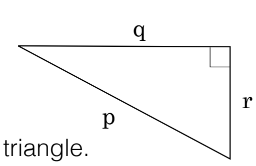
Example :



Write the *rule of Pythagoras* for this right angled triangle.

Working : q is the hypotenuse so $q^2 = p^2 + r^2$.

3a) Which side in this triangle is the hypotenuse? ....



b) Write down Pythagoras' rule for this triangle.

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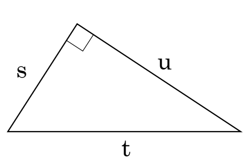
4 Write down Pythagoras' rule for each of these triangles.

a)



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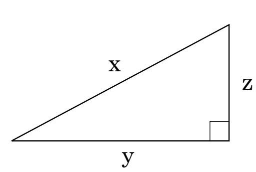
b)



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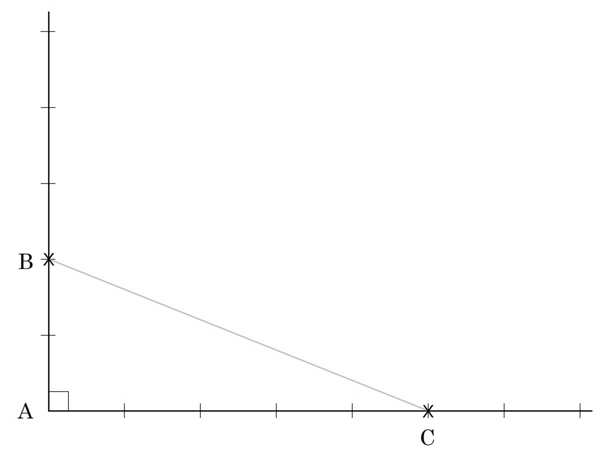
B Your Choice



A is the right angle of a right angled triangle.
We will check Pythagoras' rule for different lengths of sides.

Example :
With pencil, draw a line from B to C, measure side $\overline{BC}$.
In ΔABC, side $\overline{BC}$ = 5.4 cm, $\overline{AB}$ = 2 cm, $\overline{AC}$ = 5 cm.

Checking : $\overline{BC}$ is the hypotenuse.
Is 5.4^2 equal to $2^2 + 5^2$?
$5.4^2 = 29.16$ or 29 to the nearest whole.
$2^2 + 5^2 = 4 + 25 = 29$. Pythagoras' rule is correct.

1 Choose B and C in other positions on the lines.
Measure $\overline{AB}$, $\overline{AC}$ and $\overline{BC}$, then check Pythagoras' rule.

a) First choice :

$\overline{BC}$ = ... cm, $\overline{AB}$ = ... cm, $\overline{AC}$ = ... cm

$\overline{BC}^2$ = ...

$\overline{AB}^2 + \overline{AC}^2$ = ...

Comment : ....

b) Second choice :

$\overline{BC}$ = ... cm, $\overline{AB}$ = ... cm, $\overline{AC}$ = ... cm

$\overline{BC}^2$ = ...

$\overline{AB}^2 + \overline{AC}^2$ = ...

Comment : ....

c) Third choice :

$\overline{BC}$ = ... cm, $\overline{AB}$ = ... cm, $\overline{AC}$ = ... cm

$\overline{BC}^2$ = ...

$\overline{AB}^2 + \overline{AC}^2$ = ...

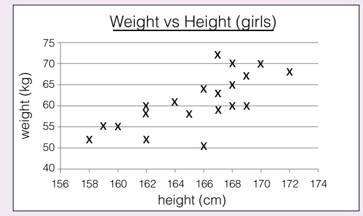
Comment : ....

A Graphing Paired Data

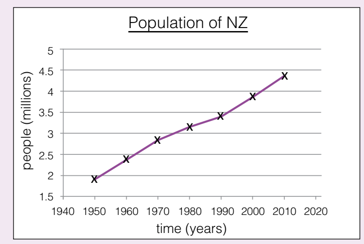
In some investigations the data comes in pairs. Paired data is graphed on a grid with two axes and each data point is plotted with a cross.

Paired data can be found in two types of investigations :

1] Investigating a **relationship between two variables**.
Example: We investigate the relationship between height and weight of girls at our school.
Each girl in our sample of 20 comes with a pair of measurements : (height in cm, weight in kg), so the graph consists of 20 plotted points.
In the graph showing a relationship we do not connect the crosses.
The graph is called a **scatter plot** or a **scatter graph**.



2] Investigating **changes in a variable over time**.
Example: We investigate changes in the New Zealand population from 1950 to 2010.
If the variable 'population size of NZ' is recorded at 10 year intervals starting at 1950, then we get a list of 7 pairs (year, population), so the graph consists of 7 plotted points.
In the graph showing changes over time we do connect the crosses with straight lines.
The graph is called a **line graph** or a **time series graph**.



1 Mr Wright reads the electricity meter on the last day of each month. The list shows the units he used last year.

month	units
Jan	180
Feb	250
Mar	50
Apr	360
May	480
Jun	500
July	610
Aug	750
Sep	590
Oct	480
Nov	310
Dec	220

a) Plot a graph for the data.

b) What is the name of the graph? ....

or ....

c) i) What reading seems to be out of line? ....

ii) What could be the reason for this?

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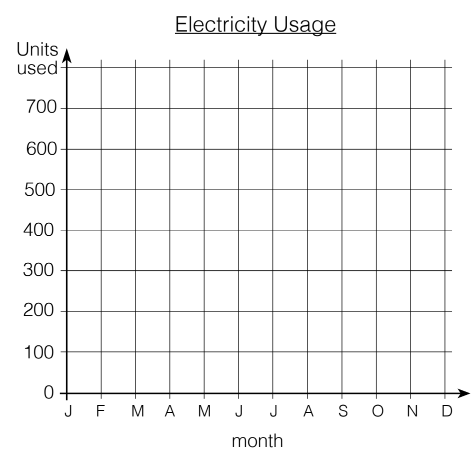

2 Brooke investigates the relationship between length of femur (thigh bone) and overall height of girls in Year 10.
She took measurements from a sample of 12 girls from her Year 10 class.

Name	Kate	Lucy	Chloe	Amy	Amber	Molly	Olive	Tessa	Isla	Emily	Leah	Sophie
length of femur (cm)	45	49	48	46	50	51	48	44	49	47	47	52
height (cm)	162	169	166	164	168	171	164	161	167	162	166	171

a) Plot the points on this grid.

b) What is the name of the graph? ....

c) Brooke forgot to include her own measurements. She is 167 cm tall and her femur measures 49 cm. There is a small problem with plotting Brooke's measurements. What is the problem and how would you solve it?

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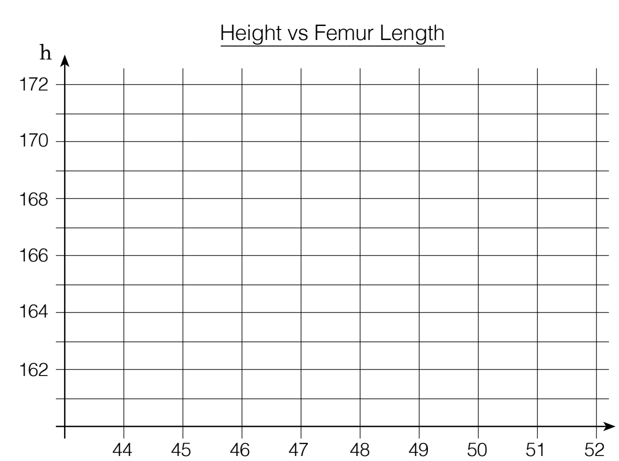

Experimental Probability 2

A My Experiment

There are six steps in conducting an experiment :

1 - Define the problem	2 - Set up the experiment	3 - Do the trials
4 - Draw conclusions	5 - Think about improvements	6 - Test the conclusion with more trials

A coin when tossed has two possible outcomes, a head or a tail. If the coin is fair it should land on heads about half the time. We don't need an experiment to find this out.

Find an item which has two possible outcomes when dropped (for example a drawing pin, bottle top, buttered slice of toast). You are going to do an experiment to calculate the probability of landing on one of the two positions.

Step 1 - Define the problem (Complete these sentences.)

In this experiment I will toss a ……………………………………………… I expect that there are two possible outcomes,

either …………………………………………………………………… or ……………………………………………………………………

I want to find the probability that it lands on ……………………………………………………………………

Step 2 - Setting up the experiment (Describe how you will do each trial. Will you roll, flick or drop the thing? How many trials will there be? Draw up a tally table.)

For each trial I will ………

……

I will do each trial ……………………… times.

I will keep a tally of the outcomes in this tally table.

Step 3 - Do the trials (Make sure you count the trials.)

Step 4 - Draw conclusions (Describe what happened.)

In this experiment I did ………………… trials and found that

……………………………………………………………………

……

……

The proportion of times my object landed on ……………………………………………………… is ……………………………………

If I do this experiment another ……………… times I expect to get ……………………………………………………………………

Step 5 - Think about improvements (Did anything go wrong during the trials? Should you have done things differently?)

……

……

……

Step 6 - Test the conclusion with more trials (You could do your own experiment again or swap with another student.)

The experiment was done again and it was found that this time the proportion was ………………………………

That is different / about the same. (cross one out.)