

# Direct Proportion

Two quantities, (for example, number of cakes and total cost) are said to be in **DIRECT** Proportion, if :

".. When you double the number of cakes you double the cost."

**Example:** The cost of 6 cakes is £4.20. find the cost of 5 cakes.

Cakes	Cost
6	⇒ 4.20
1	⇒ $4.20 \div 6 = 0.70$
5	⇒ $0.70 \times 5 = \text{£}3.50$

## Direct Proportion

2

## The Circle

2, 3

Circumference is  $C = \pi D$

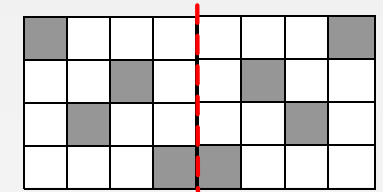
Semi-circle angle is always  $90^\circ$

Area is  $A = \pi r^2$

Diameter  $D = 2r$

Radius  $r = \frac{1}{2}D$

Example: Complete the rest of the shape given the line of symmetry.



The order of symmetry is the number of times a shape looks the same in one complete turn.

Has order 2

Has order 3

Has order 4

## Symmetry

2, 3

# S4 Mathematics General Course

Two key points when dealing with right-angled triangles

The longest side in a right-angled triangle is called The **HYPOTENUSE**

The **HYPOTENUSE** is ALWAYS opposite the right angle

$c^2 = a^2 + b^2$

$(xz)^2 = (xy)^2 + (yz)^2$

## Pythagoras Theorem

2

Take any common factors out and put them outside the brackets.

$4xy - 2x = 2x(2y - 1)$

## Factorisation

2

## Speed Time Distance

2

$D = S \times T$

$S = \frac{D}{T}$

$T = \frac{D}{S}$

To change minutes to decimal hours 'divide minutes by 60'

To change decimal time to minutes 'multiply the decimal part by 60'

Simple way to remember the 3 formulae!

**Example:** The ratio of boys to girls is 4:5. If there are 16 boys, how many girls are there.

boys	girls
4	5
$\times 4$	$\times 4$
16	20

## Ratio

2

## Variation

2

The number of dollars (d) varies directly as the number of £'s (P). You get 3 dollars for £2. Find a formula connecting d and P.

Since d is directly proportional to P the formula is of the form  $d = kP$ .

$3 = k(2)$

$d = 3 \quad k = 3 \div 2 = 1.5$

$P = 2$

k is a constant

## Similar Figures

2

Find a given ESF = 3

$ESF = 3 = \frac{a}{9}$

By finding the RSF Find the value of b.

$RSF = \frac{1}{3} = \frac{b}{15} = \frac{5}{15}$

## Volume

2, 3

Working

Volume =  $l \times b \times h$

$V = 18 \times 5 \times 27$

$V = 2430 \text{ cm}^3$

## Straight Line

2

Vertical height

Horizontal Distance

Gradient =  $\frac{\text{Vertical height}}{\text{Horizontal Distance}}$

To draw a straight line Make a table For values of x find y. Plot points.

All straight lines have the equation of the form  $y = mx + c$

Where line meets y-axis

Gradient

Find the equations of the following lines

$y = x$     $y = x+4$     $y = 4x+2$     $y = -2x+2$

**Example**

Find the surface area of the cuboid

Working

Front Area =  $l \times b = 5 \times 4 = 20\text{cm}^2$

Top Area =  $l \times b = 5 \times 3 = 15\text{cm}^2$

Side Area =  $l \times b = 3 \times 4 = 12\text{cm}^2$

Total Area =  $20+20+15+15+12+12 = 94\text{cm}^2$

## Surface Area

2, 3

Write down equation with constant k. Calculate the value of k. Write out the equation with the value of k. Use the equation for the rest of the question.

**Process**

- Write down **(SOH)(CAH)(TOA)**
- Identify what you want to find
- what you know

**SOHCAHTOA**

Opposite

Adjacent

hypotenuse

$x^\circ$

$\sin x^\circ = \frac{\text{Opp}}{\text{Hyp}}$     $\cos x^\circ = \frac{\text{Adj}}{\text{Hyp}}$     $\tan x^\circ = \frac{\text{Opp}}{\text{Adj}}$

**SOHCAHTOA**