

Area of Sector = $\frac{\text{Angle at Centre}}{360^\circ} \times \pi r^2$

Arc length = $\frac{\text{Angle at Centre}}{360^\circ} \times \pi D$

Process

Decide the 2 ratios to use.

Identify what you want to find

What you know

Solve

Angles

Outside $< 90^\circ$

Circumference $= 90^\circ$

Inside $> 90^\circ$

Pythagoras Theorem

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

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

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

Converse Theorem states that if

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

1. Then triangle **MUST** be right-angled.

2. Right-angle is directly opposite C.

Hypotenuse

Special Property

The point of contact radius is always perpendicular (right-angled) to the tangent line.

The Circle

Speed time Distance

$D = S \times T$

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

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

Simple way to remember the 3 formulae!

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

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

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

Check for the difference of two squares. $6x^2 - 24 = 6(x + 2)(x - 2)$

Factorise any quadratic expression left using St. Andrew's cross.

$3x^2 - x - 4$

$(3x - 4)(x + 1)$

Factorisation

- Basic Factorisation

S3 Mathematics Credit Course

Simultaneous Equations

One evening 4 adults and 6 children visited the sports centre. The total collected in entrance fees was £97.60

The next evening 7 adults and 4 children visited the sports centre. The total collected in entrance fees was £126.60

Calculate the cost of an adult price and a child price.

Solve the equations

$4x + 6y = 97.60$

$7x + 4y = 126.60$

by elimination

Step 1: Label the equations

$4x + 6y = 97.6$ (A)

$7x + 4y = 126.6$ (B)

Step 2: Decide what you want to eliminate

Eliminate x by:

$16x + 24y = 390.4$ (A) $\times 4$

$42x + 24y = 759.6$ (B) $\times 6$

$-26x = -369.2$

$x = (-369.2) \div (-26) = \text{£}14.20$

Step 3: Sub into one of the equations to get other variable

Substitute $y = 14.20$ in equation (A)

$4 \times 14.20 + 6y = 97.60$

$6y = 97.60 - 56.80$

$6y = 40.80$

$y = \text{£}6.80$

The solution is $x = \text{adult price} = \text{£}14.20$

$y = \text{child price} = \text{£}6.80$

Check answers by substituting into both equations

$4x + 6y = 97.60$ ($56.80 + 40.80 = \text{£}97.60$)

$7x + 4y = 126.60$ ($99.40 + 27.20 = \text{£}126.60$)

Standard Deviation

Smaller deviation data more **CONSISTENT** (less variation)

Heart rate (x)	x^2
70	4900
72	5184
73	5329
74	5476
75	5625
76	5776
76	5776
76	5776
Totals	$\Sigma x = 592$ $\Sigma x^2 = 43842$

$s = \sqrt{\frac{(\Sigma x^2) - \frac{(\Sigma x)^2}{n}}{n-1}}$

$= \sqrt{\frac{(43842) - \frac{(592)^2}{8}}{8-1}}$

$= 2.2$ (to 1 d.p.)

Variation

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.

Q. The cost (C) of producing a football magazine varies as the square root of the number of pages (P). Given 36 pages cost 45p to produce. Find a formula connecting C and P.

Since C is directly proportional to "square root of" P the formula is of the form

$C = k\sqrt{P}$

$48 = k\sqrt{36}$

$k = 48 \div 6 = 8$

$C = 8\sqrt{P}$

Box and Whisker Diagrams.

Box plots are useful for comparing two or more sets of data like that shown below for heights of boys and girls in a class.

Anatomy of a Box and Whisker Diagram.

Lowest Value, Lower Quartile, median, Upper Quartile, Highest Value

Whisker, Box, Whisker

Boys, Girls

Boxplots / Stem Leaf

Weight (kgs)
1 2 2 3 5 5
2 1 3 9
3 2 2
4 0 0 1 1
5 1 4 5 5 5 7
stem leaves

n = 20 Key: 2 | 3 means 23

A car has lost 15% of its value in a year. It is now valued at £2550. What was its original price.

Deduce from question: $100\% - 15\% = \text{£}2\,550$

We have: $85\% = \text{£}2\,550$

$1\% \Rightarrow \text{£}2550 \div 85 = \text{£}30$

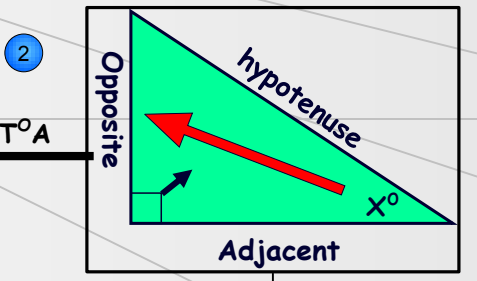
Price before is 100% $\Rightarrow \text{£}30 \times 100 = \text{£}3\,000$

Percentage Original Price

- Basic Percentages

Process

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



$\text{Sin } x^\circ = \frac{\text{Opp}}{\text{Hyp}}$ $\text{Cos } x^\circ = \frac{\text{Adj}}{\text{Hyp}}$ $\text{Tan } x^\circ = \frac{\text{Opp}}{\text{Adj}}$

SOHCAHTOA