

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

Pythagoras Theorem

Outside $< 90^\circ$

Circumference $= 90^\circ$

Inside $> 90^\circ$

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

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

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

Special Property

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

The Circle

1

2

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'

- 1
- 2
- 1

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

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

1

2 Basic Factorisation

S3 Mathematics Credit Course

Simultaneous Equations

1

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) x4

$42x + 24y = 759.6$ (B) x6

$-26x = -369.2$

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

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)

1

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

1

y varies directly as \sqrt{x} and inversely as z^3 .

When $y = 40$, $x = 25$ and $z = 3$.

Find a formula connecting y, x and z.

Since y is directly as \sqrt{x} and inversely as cube of z the formula is of the form

$y \propto \frac{\sqrt{x}}{z^3}$ $y = \frac{k\sqrt{x}}{z^3}$ $y = \frac{216\sqrt{x}}{z^3}$

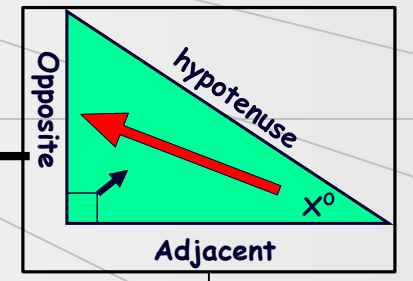
$k = 40 \times 3^3 \div \sqrt{25} = 216$

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

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

SOHCAHTOA

Boxplots / Stem Leaf

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

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

- 1
- 2

Percentage

Original Price

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% $\Rightarrow \text{£}30 \times 100 = \text{£}3\ 000$

- 1
- 2 Basic Percentages