



## Key Words

|                   |  |
|-------------------|--|
| Polygon           | A straight sided shape   |
| Product of Primes | A prime number is <b>any number with no divisors other than itself and 1</b> , such as <b>2 and 11</b> . Any number can be written as a product of prime numbers in a unique way |
| Hypotenuse        | The longest side of a right angles triangle that is opposite the right angle   |
| Sector            | A part of a circle that is represented in a pie chart  |



## Angles in Polygons

## Key Information

## Improper Fractions and Mixed Numbers



We can work out the angle sum of any polygon by splitting it into triangles. Remember that the angles in a triangle =  $180^\circ$ .

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| <b>Triangle</b><br><br>$1 \times 180^\circ = 180^\circ$ | <b>Quadrilateral</b><br><br>$2 \times 180^\circ = 360^\circ$ | <b>Pentagon</b><br><br>$3 \times 180^\circ = 540^\circ$ |
| <b>Hexagon</b><br><br>$4 \times 180^\circ = 720^\circ$  | <b>Heptagon</b><br><br>$5 \times 180^\circ = 900^\circ$      | <b>Octagon</b><br><br>$6 \times 180^\circ = 1080^\circ$ |

If the polygon has  $n$  sides, there will be  $(n - 2)$  triangles inside.  
 Angle sum =  $(n - 2) \times 180$

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| $2\frac{2}{3} = \frac{8}{3}$<br>There are 3 thirds in 1.<br>So there are $2 \times 3 = 6$ thirds in 2.<br>We also have an extra 2 thirds, so add this on.<br>In total, $2 \times 3 + 2$ thirds 8 thirds altogether | $3\frac{5}{6} = \frac{23}{6}$<br>There are 6 sixths in 1.<br>So there are $3 \times 6 = 18$ sixths in 3.<br>We also have an extra 5 sixths, so add this on.<br>In total, $3 \times 6 + 5$ sixths 23 sixths altogether |
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## Product of primes



## Frequency Tables

Any composite number can be split up into a product of prime factors - primes which multiply to give the original number.

You can use a "tree" to organise your work when finding the product of primes.

Split 12 into two factors ( $2 \times 6$ ).

2 is prime; stop this branch.

6 is not prime; split 6 into two factors ( $2 \times 3$ ).

Both 2 and 3 are prime; stop here.

Write your answer as a product of the prime numbers.

In power/index form, this would be  $2^2 \times 3$

The table gives information about the numbers of badges gained by the girls in a Guide group.

| Number of badges | Frequency | $f/x$ |
|------------------|-----------|-------|
| 0                | 2         | 0     |
| 1                | 8         | 8     |
| 2                | 4         | 8     |
| 3                | 3         | 9     |
| 4                | 5         | 20    |
| 5                | 3         | 15    |

a) 1  
 b)  $5 - 0 = 5$   
 c) 25 Guides altogether  
 $\frac{25+1}{2} = 13^{th}$  Guide  
 13<sup>th</sup> Guide has 2 badges

d) Total number of badges = 60  
 Total number of Guides = 25  
 $60 \div 25 = 2.4$  badges

Mode = most frequent  
 Range = biggest - smallest  
 Median = middle  
 Mean = mathematical average (add, then divide)



## Pythagoras



## Pie Charts

You can use Pythagoras' Theorem to find a missing side length in a right-angled triangle.

**Finding a hypotenuse**

Always begin by identifying the hypotenuse. This is the longest side, and is always opposite the right angle.

You might also want to label the other two sides with  $a$  and  $b$  (either way round).

$a^2 + b^2 = h^2$

$3^2 + 5^2 = h^2$

$9 + 25 = h^2$

$34 = h^2$

Square root to "undo" the squaring operation.

$\sqrt{34} = h$

This answer is in surd form. To get a decimal answer, work out  $\sqrt{34}$  on a calculator.

**Finding a short side**

Make sure you can rearrange formulae confidently!

Label the sides, write down the formula and substitute as before.

$a^2 + b^2 = h^2$

$x^2 + 4^2 = 7^2$

$x^2 + 16 = 49$

Subtract 16 so the left hand side reads  $x^2 = \dots$

$x^2 = 49 - 16$

$x^2 = 33$

Square root to "undo" the squaring operation as before.

$x = \sqrt{33}$

This answer is in surd form. To get a decimal answer, work out  $\sqrt{33}$  on a calculator.

90 people were surveyed, how many people liked football?

$\frac{360}{90} = 4^\circ$

$4^\circ = 1 \text{ person}$

$\frac{120^\circ}{4^\circ} = 30 \text{ people}$