## SEQUENCES

A sequence is defined by the term-to-term rule:

$$U_{n+1} = U_n^2 - 8U_n + 17$$

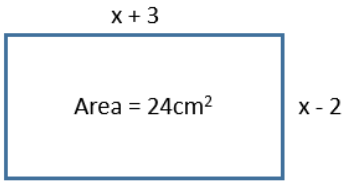
Given that $U_1 = 4$, find $U_2$ and $U_3$.

## STANDARD FORM

Put these numbers in ascending order.

$$6 \times 10^3, 0.076, 9.2 \times 10^4, 67000, 4 \times 10^{-3}$$

## PROOF/ SHOW THAT/ CONGRUENCE




a) Show that $x^2 + x - 30 = 0$

b) Hence, find the dimensions of the rectangle.

## COORDINATE GEOMETRY

A(2, 7) and B(5, 13).

a) Find the length of the line segment AB

b) Find the gradient of the line segment AB.

## ESTIMATION AND BOUNDS

A field is the shape of a rectangle.
The length of the field is 340 m, to the nearest metre.
The width of the field is 117 m, to the nearest metre.
How much fencing should be bought to go around the full perimeter? Explain.

## PROBABILITY/ COMBINATIONS

A bag contains counters that are red, blue, green and yellow. The number of counters of each colour are:
Red = 9, Blue = 3x, Green = x – 5 and Yellow = 2x.
A counter is chosen at random. The probability of red is $\frac{9}{100}$. Work out the probability it is green.

## QUADRATICS/ INEQUALITIES

Solve:

$$x^2 - 6x + 8 > 0$$

## SIMULTANEOUS EQUATIONS

Solve:

$$x^2 + y^2 = 29$$
$$y - x = 3$$

**RATIO AND PROPORTION**

y is inversely proportional to x.
x = 5 when y = 12.

a) Find an equation connecting x and y.

b) Work out y when x = 20.

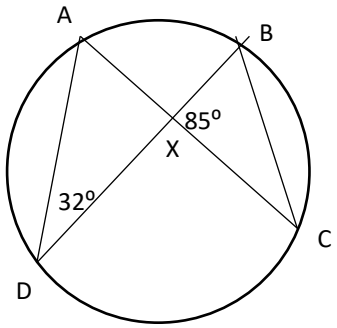
**SIMPLIFY/ RE-ARRANGE/ SOLVE**

Make x the subject:

$$y = \sqrt{\frac{5}{1-x}}$$

**ANGLES & CIRCLE THEOREMS**

What is the size of angle CBX?

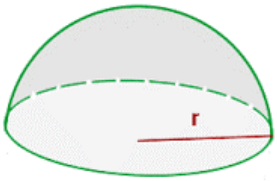



**SURDS**

Expand $(5-\sqrt{2})(2+\sqrt{3})$

**AREA/ PERIMETER/ VOLUME**

Find the volume and surface area of a hemisphere with radius 7cm.

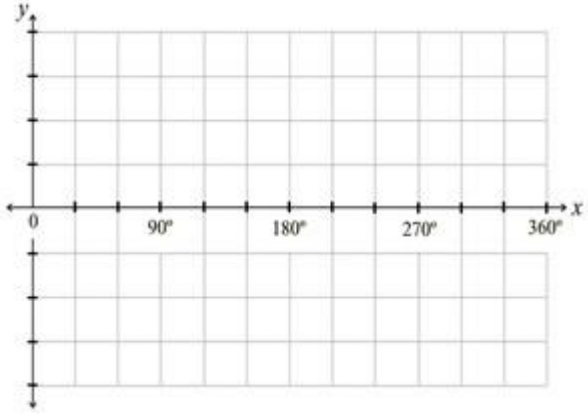



**FRACTIONS/ DECIMALS/ RECURRING DECIMALS**

Prove the recurring decimal $0.4\dot{7}\dot{3}$ can be written as the fraction $\frac{469}{990}$

**TRIGONOMETRY/ GRAPHS**

Sketch the graph of y = sin x on the grid below.



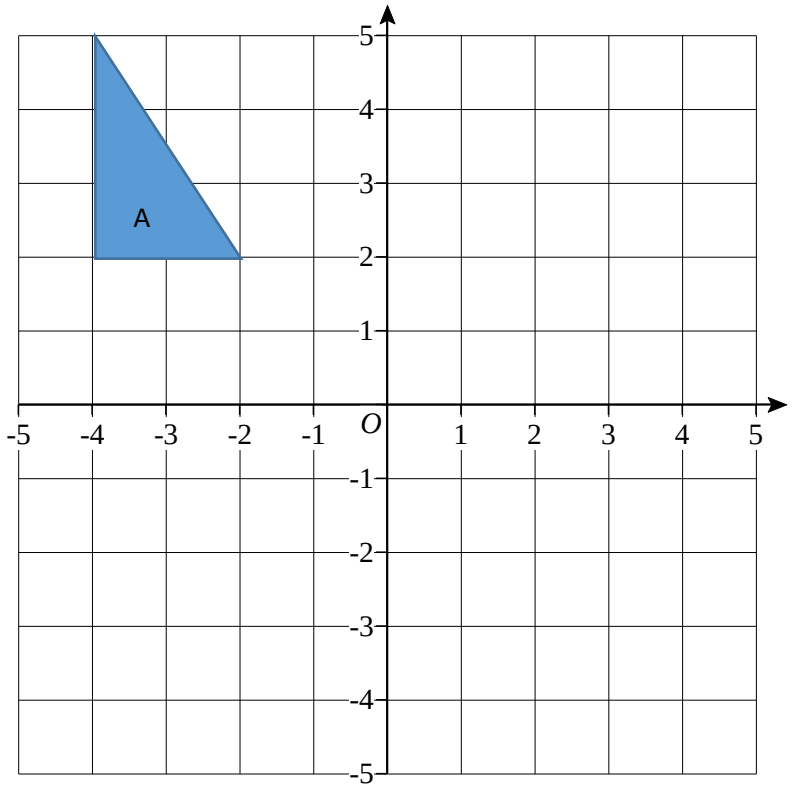

**PERCENTAGES**

After a year the price of a car increased by 20%, after another year the price increased by a further 10%. Find the total percentage increase.

**TRANSFORMATIONS**

a) Enlarge the shape scale factor $-\frac{1}{2}$ using the centre of enlargement (0, 0).

b) Describe what this does to the shape A.

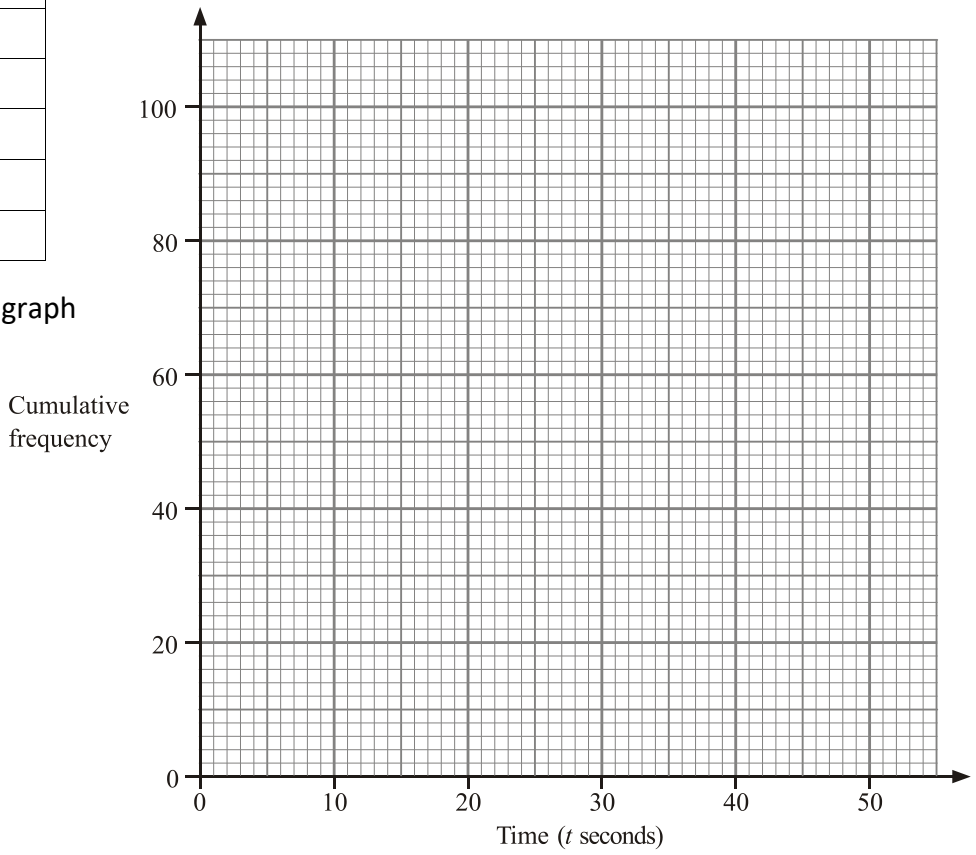



**GRAPHS AND CHARTS (HISTOGRAM,CUMULATIVE FREQUENCY ETC)**

The table shows the lengths of 100 calls at a call centre.

| Time ($t$ seconds) | Frequency |
|---|---|
| $0 < t \leq 10$ | 16 |
| $10 < t \leq 20$ | 34 |
| $20 < t \leq 30$ | 32 |
| $30 < t \leq 40$ | 14 |
| $40 < t \leq 50$ | 4 |

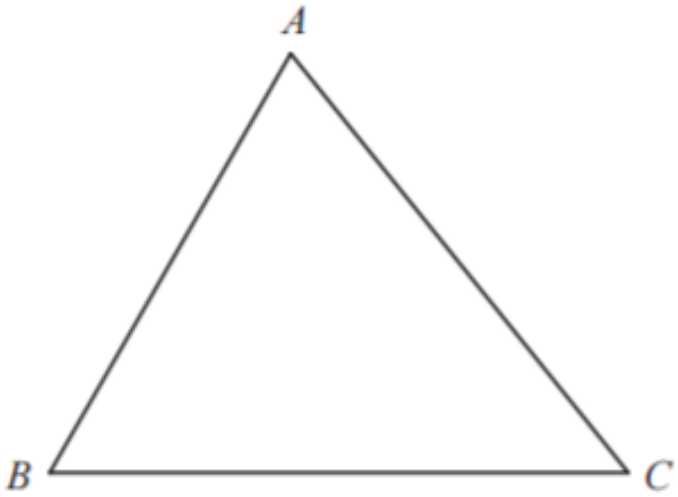
Draw a cumulative frequency graph to represent this information.



**LOCI/CONSTRUCTIONS**

ABC is a triangle.
Shade the region inside the triangle which is both

Less than 4 centimetres from the point B
And closer to the line AC than line AB.




**ALGEBRAIC GRAPHS – INCLUDING REGIONS, SOLVING AND TRANSFORMING**

a) Complete this table of values for $y = x^2 - x - 1$ and sketch the graph.

| x | -2 | -1 | 0 | 1 | 2 | 3 |
|---|---|---|---|---|---|---|
| y | | | | | | |

b) Hence, solve the equation:

$x^2 - x - 1 = 3$