GCSE Mathematics (Grade 9-1)

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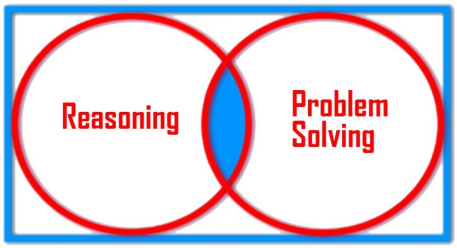

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Problem Solving Set 3

{Aimed at students working towards a Grade 9 or 8}

The grades and marks shown are for guidance Purposes only

You may NOT use a Calculator for these set of questions

Strategies to help you in Mathematical Problem Solving

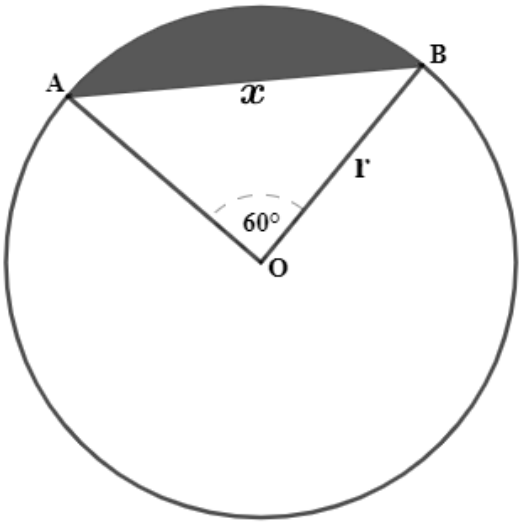
- Read the question carefully
- Sketch a diagram where applicable
- Take note of key information
- Write down any formulae you may need
- Tackle the problem in bite size rather than as a whole
- Concentrate on the parts of the problem that make sense to you and try to solve those first
- Collaborate with a partner and share ideas
- Use a dictionary to find the meaning of any confusing words
- Check that your answers make sense in the context of the question

Some Useful Formulae

Sine Rule : $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$

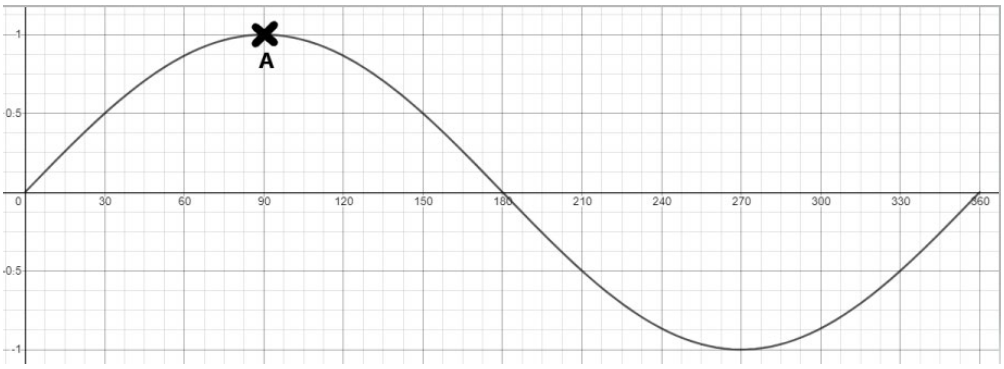
Area of a Triangle $= \frac{1}{2}ab\sin C$

1 The diagram below shows a circle with centre O and radius *r*.
The interior angle of the sector is 60°



Show that the area of the shaded segment can be written as
$\frac{r^2}{2}\left(\frac{\pi}{3}-\frac{\sqrt{3}}{2}\right)$ **[5Marks]**

2 Part of the graph of the function $f(x) = \sin x$ is shown below
The point A is the maximum point of the graph.

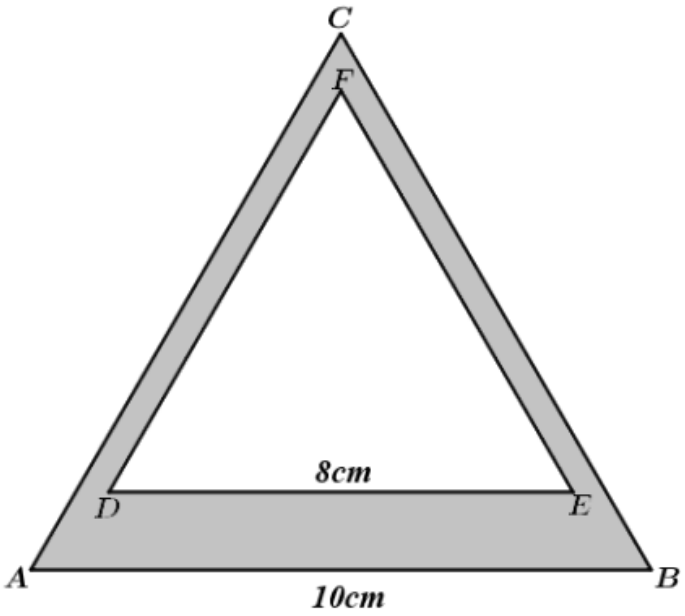


a) Write down the coordinates of the maximum point of the graph of the function $y = f(x - 50)$ **[1Mark]**

b) The maximum point of a transformation of $f(x)$ is given as $(-30, -3)$. Write down the equation of the transformed graph **[2Marks]**

3 Show that $\tan 60 \div \sin 45 = \sqrt{6}$ **[4Marks]**

4 Two equilateral triangles, ABC and EDF are shown below
The side length of triangle ABC is 10cm
The side length of triangle EDF is 8cm



Calculate the exact size of the shaded area. **[5Marks]**

5 Solve the equation $\sqrt{5} \times 25^{x} = \frac{1}{125}$

Give your answer as an exact value **[4Marks]**