

Pure 19 – Trig Graphs and Simple equations

Please **complete** this homework by _____. Start it early. If you can't do a question you will then have time to ask your teacher for help or go to a drop in session.

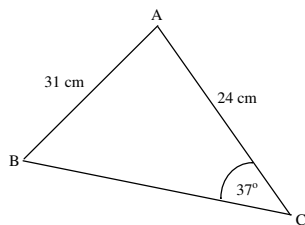
Section 1 – Review of previous topics. Please complete all questions.

A: Starting from the curve $y = x^3 + 2x + 3$, describe the transformation of the original curve for each of the graphs below:

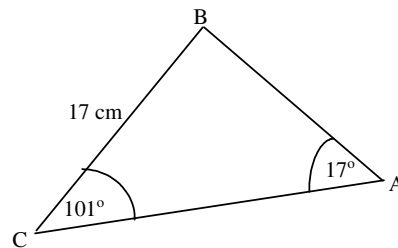
- | | |
|---|-----------------------------------|
| 1. $y = x^3 + 2x + 5$ | 2. $y = -x^3 - 2x + 3$ |
| 3. $y = x^3 + 2x - 1$ | 4. $y = (x + 3)^3 + 2(x + 3) + 3$ |
| 5. $y = -x^3 - 2x - 3$ | 6. $y = (x - 3)^3 + 2(x - 3) + 3$ |
| 7. $y = 2x^3 + 4x + 6$ | 8. $y = 8x^3 + 4x + 3$ |
| 9. $y = \left(\frac{x}{2}\right)^3 + x + 3$ | |

B: For each of the following triangles find all the missing sides and angles, and the area.

1)



3)



2)

$$AB = 19\text{cm}$$

$$AC = 24\text{cm}$$

$$C = 37^\circ$$

4)

$$A = 62^\circ$$

$$AB = 12.2\text{ cm}$$

$$BC = 14.5\text{ cm}$$

Section 2 – Consolidation of this week's topic. Please complete all questions.

1. **Sketch** the graphs of:

a) $y = \sin(3x)$ [2]

b) $y = 1.5\cos(x)$ [2]

c) $y = \sin(x - 60^\circ)$ [2]

d) $y = 2 + \cos(x)$ [2]

e) $y = 2\sin(0.5x)$ [2]

f) $y = 1 + \tan(x)$ [2]

2. Solve for x , $0^\circ \leq x \leq 360^\circ$, giving your answers to 1 d. p.

a) $\sin x = 0.37$

b) $\cos x = 0.61$

c) $\tan x = 1.2$

[6]

3. Solve for x , $0 \leq x \leq 360^\circ$, giving your answers to 3 s. f.

a) $\cos x = 0.9$ b) $\sin x = 0.41$ c) $\tan x = 0.74$ [6]

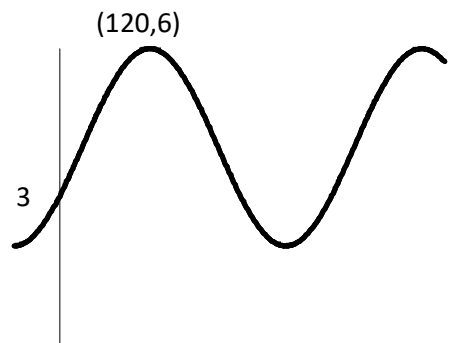
4. Solve for x , $0^\circ \leq x \leq 360^\circ$.

a) $\sin 2x = -\frac{1}{2}$ b) $\cos(x - 30^\circ) = \frac{1}{\sqrt{2}}$ c) $\tan \frac{1}{2}x = -1$ [6]

5. Solve for x , $0 \leq x \leq 360^\circ$, giving your answers to 3 s.f.

a) $\sin x = -\frac{\sqrt{3}}{2}$ b) $\cos 2x = \frac{1}{\sqrt{2}}$ c) $\tan(x + 45^\circ) = \sqrt{3}$ [6]

6.

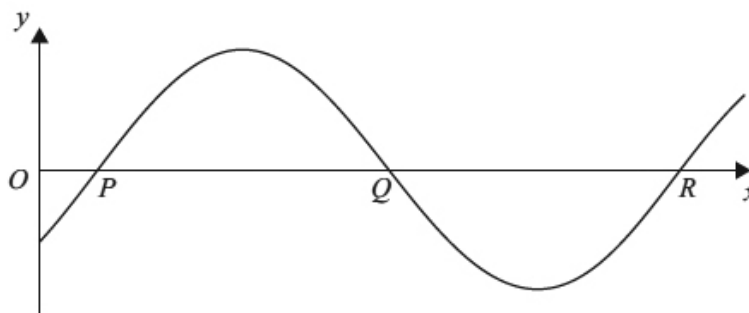


The graph shown above has the equation $y = A + B \sin(t - k)$, $t \geq 0$ where A , B and k are positive constants and k is an angle between 0° and 90° .

- a) Show that $k = 30^\circ$ [2]
 b) Show that $A - \frac{1}{2}B = 3$, and obtain a similar equation for $A+B$ [4]
 c) Solve your equations to find the values of A and B [4]
 d) Find the coordinates of the first two minimum points of the graph [4]

(Total 50 Marks)

Section 3 – Extension questions. If you are aiming for a top grade, you should attempt these questions.



The diagram above shows part of the curve with equation

$y = \sin(ax - b)$, where $a > 0$, $0 < b < 180^\circ$

The curve cuts the x -axis at the points P , Q and R as shown.

Given that the coordinates of P , Q and R , are $(18^\circ, 0)$, $(108^\circ, 0)$ and $(198^\circ, 0)$ respectively, find the values of a and b .