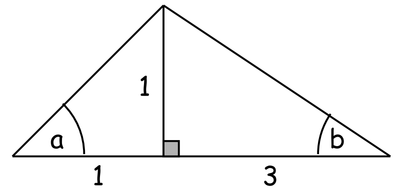
Higher Homework 11

1) In triangle ABC, show that the exact value of

$\sin(a + b)$ is $\dfrac{2}{\sqrt{5}}$



2) A function f is defined by the formula $f(x) = 2x^3 - 7x^2 + 9$ where x is a real number.

a) Show that $(x - 3)$ is a factor of $f(x)$ and hence factorise $f(x)$ fully.

b) Find the coordinates of the points where the curve with equation $y = f(x)$ crosses the x– and y– axes.

c) Find the greatest and least values of $f(x)$ on the interval $-2 \le x \le 2$.

3) Show that the equation $(1 - 2k)x^2 - 5kx - 2k = 0$ has real roots for all integer values of k.

4) Solve,

a) $3\cos 2x - \cos x = -2$ for $0 \le x \le 360°$.

b) $\sin 2x - 2\cos x = 0$ for $0 \le x \le 360°$.

5) The circles with equations $(x - 3)^2 + (y - 4)^2 = 25$ and $x^2 + y^2 - kx - 8y - 2k = 0$ have the same centre.
Determine the radius of the larger circle.

6) Find the equation of the tangent to the circle $x^2 + y^2 + 6x - 4y - 24 = 0$ at the point $(-9, 3)$.

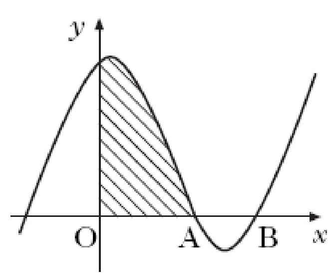
7) Find the stationary points on the curve $y = x^3 - 6x^2 + 9x - 4$ and determine the nature of each of them.

8) The diagram shows a sketch of the graph of $y = x^3 - 4x^2 + x + 6$.

a) Show that the graph cuts the x – axis at (3,0).

b) Hence or otherwise find the coordinates of A.

c) Find the shaded area.



9) Given that, $f(x) = \sqrt{x} + \dfrac{2}{x^2}$, find $f'(4)$.