

# CFe Higher Maths Homework (14)

\* <sup>needed</sup>  
in equation

① If  $f(x) = (2x+3)^5$  find  $f'(1)$

② Find the inverse  $f^{-1}(x)$  of the function  $f(x) = 9-5x$

③  $A(3, 2, -1)$ ,  $B(6, 0, 1)$  and  $C(4, -1, 2)$   
Calculate the size of angle BAC.

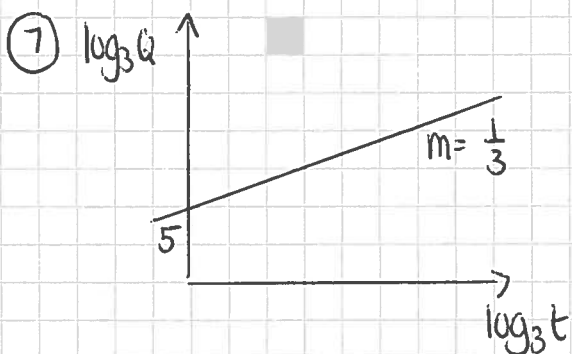
④  $f(x) = 2\cos x + 3\sin x$

(a) Express  $f(x)$  in the form  $k\cos(x-\alpha)$  where  $k > 0$   
and  $0 \leq \alpha < 360^\circ$

(b) Hence solve algebraically  $f(x) = 0.5$  for  $0 \leq x < 360^\circ$

\* ⑤ Find  $\int \frac{x\sqrt{x+4}}{x^2} dx$

⑥ Solve the equation  $\sin 2x - \sin x = 0$  for  $0 \leq x < 2\pi$



Find an equation connecting  $t$  and  $6$ .

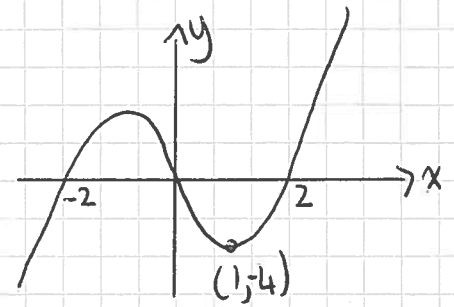
\* ⑧ A curve has as its derivative  $\frac{dy}{dx} = 3x^2 + 1$

Given that the point  $(-1, 2)$  lies on the curve, express  $y$  in terms of  $x$ .

\* ⑨ Determine  $p$  given that  $\int_1^p \sqrt{x} dx = 42$

⑩ Given that  $(x+1)$  and  $(x-3)$  are factors of  $f(x) = 2x^3 - 5x^2 + px + q$ , find  $p$  and  $q$ .

⑪ Find a suitable equation to describe this cubic function.



⑫ Solve the equation  $\cos 2x = 4\cos x + 5$  for  $0 \leq x < 2\pi$ .

⑬ A function is defined on a suitable domain as

$$f(x) = \frac{16}{(2-x^2)}$$

Find the equation of the tangent to the curve  $y = f(x)$  at the point where  $x = 2$

⑭ Given that  $\log_5(x^2 - 1) - \log_5(x + 1) = \log_2 8$  find the value(s) of  $x$ .

⑮ For what values of  $p$  does the equation  $x^2 - 2px + (2-p) = 0$  have equal roots?

\* ⑯ Show that  $\int_{\frac{\pi}{4}}^{\frac{\pi}{2}} 2\sin 2x \, dx = 1$

⑰ A curve has the equation  $y = -x^4 + 4x^3 - 2$ .

An incomplete sketch is shown.

Find the co-ordinates of the stationary points.  
(You don't need to find their nature)

