



MR DOIG'S CHRISTMAS REVISION SHEET HIGHER MATHS

Non Calculator Questions

- 1 Find the equation of the line which passes through the point $(-1, 3)$ and is perpendicular to the line with equation $4x + y - 1 = 0$. 3

A recurrence relation is defined by $u_{n+1} = pu_n + q$, where $-1 < p < 1$ and $u_0 = 12$.

- (a) If $u_1 = 15$ and $u_2 = 16$, find the values of p and q . 2
 (b) Find the limit of this recurrence relation as $n \rightarrow \infty$. 2

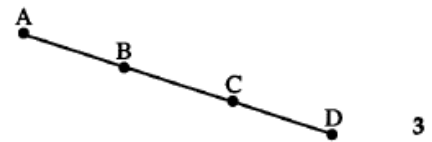
Vectors u and v are defined by $u = 3i + 2j$ and $v = 2i - 3j + 4k$.

Determine whether or not u and v are perpendicular to each other. 2

A and B are the points $(-1, -3, 2)$ and $(2, -1, 1)$ respectively.

B and C are the points of trisection of AD, that is $AB = BC = CD$.

Find the coordinates of D.

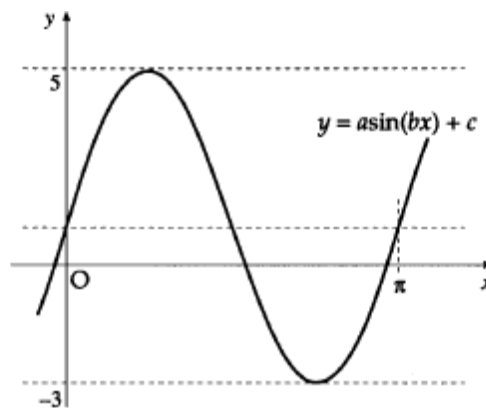


Given that $f(x) = \sqrt{x} + \frac{2}{x^2}$, find $f'(4)$. 5

Calculator Questions

The diagram shows a sketch of part of the graph of a trigonometric function whose equation is of the form $y = a \sin(bx) + c$.

Determine the values of a , b and c .



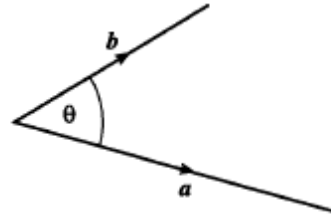
- (a) Find the equation of the tangent to the curve with equation $y = x^3 + 2x^2 - 3x + 2$ at the point where $x = 1$. 5
 (b) Show that this line is also a tangent to the circle with equation $x^2 + y^2 - 12x - 10y + 44 = 0$ and state the coordinates of the point of contact. 6

If $f(x) = \cos(2x) - 3 \sin(4x)$, find the exact value of $f'\left(\frac{\pi}{6}\right)$.

4

The diagram shows vectors a and b .

If $|a| = 5$, $|b| = 4$ and $a \cdot (a + b) = 36$, find the size of the acute angle θ between a and b .



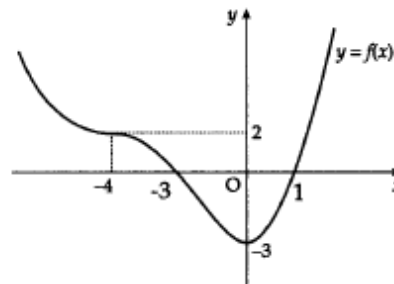
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The diagram shows part of the sketch of a function f .

f has a minimum turning point at $(0, -3)$ and a point of inflexion at $(-4, 2)$.

(a) Sketch the graph of $y = f(-x)$.

(b) On the same diagram sketch the graph of $y = 2f(-x)$.



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END OF QUESTIONS

PS HAPPY NEW YEAR!