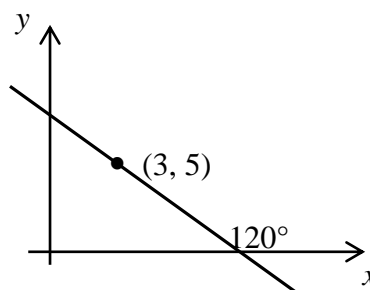




1. Find $\frac{du}{dv}$ where $u = \frac{v}{3} - \frac{5}{2v}$.
2. Show that $\cos^4 \theta - \sin^4 \theta = \cos 2\theta$
3. Calculate the angle between vectors \mathbf{u} and \mathbf{v} where $\mathbf{u} = \begin{pmatrix} 1 \\ 2 \\ -3 \end{pmatrix}$ and $\mathbf{v} = \begin{pmatrix} 0 \\ 2 \\ 4 \end{pmatrix}$.
4. Sketch the graph of $y = \log_3(x + 4)$, indicating at least 2 points on your graph.
5. If $f(x) = 2x + 4$ and $g(x) = 5 - 4x$, find a formula for the inverse of $g(f(x))$.

6. In the diagram shown, the straight line passes through the point $(3, 5)$ and makes an angle of 120° with the positive direction of the x -axis. Find the gradient and equation of this line.



7. Find the rate of change of $f(x) = (3x - 5)^4$ at $x = 2$.
8. Vectors \mathbf{a} and \mathbf{b} are perpendicular. If $\mathbf{a} = \begin{pmatrix} 3x \\ x \\ 1 \end{pmatrix}$ and $\mathbf{b} = \begin{pmatrix} 2x \\ 5 \\ -6 \end{pmatrix}$, find the value of x .
9. For what values of x is the function $f(x) = x^3 - 12x$ only decreasing.
10. Find the equation of the median AD of the triangle ABC with coordinates $A(3,2)$, $B(-8, 1)$ and $C(4,-7)$.