| 61 | Show that \( x = 1 \) is a root of 
\[ x^3 + 8x^2 + 11x - 20 = 0. \]
Hence factorise \( x^3 + 8x^2 + 11x - 20 \) fully. |
| --- | --- |
| 62 | The roots of the equation \( kx^2 - 3x + 2 = 0 \) are equal.
Calculate the value of \( k \). |
| 63 | Evaluate \( \log_2 \frac{1}{16} \). |
| 64 | Solve the equation \( 3\cos 2x + \cos x = -1 \)
in the interval \( 0 \leq x \leq 360 \). |
| 65 | The diagram shows a right-angled triangle with sides and angles marked. What is the value of \( \cos 2\alpha \)? |
| 66 | \( A = 2\pi r^2 + 6\pi r \).
What is the rate of change of \( A \) with respect to \( r \)
when \( r = 2 \)? |
| 67 | Find the equation of the tangent to the curve 
\( y = x^3 - 3x^2 + 2x \) at the point where \( x = 1 \). |
| 68 | Find \( \int \frac{1}{3x^4} \, dx \), where \( x \neq 0 \). |
| 69 | Evaluate \( \int_{\frac{\pi}{2}}^{\pi} \sin 2x + \cos 2x \, dx \). |
| 70 | Write \( 3\cos x^o + 4\sin x^o \) in the form \( k\cos(x + \alpha) \)
for \( k > 0 \) and \( 0 \leq x \leq 360 \). |
Functions \( f \) and \( g \) are defined on the set of real numbers by \( f(x) = x^2 + 3 \) and \( g(x) = x + 4 \). Find expressions for \( f(g(x)) \) and \( g(f(x)) \).

The diagram shows part of the graph of \( y = \log_3(x - 4) \). The point \((q, 2)\) lies on the graph. What is the value of \( q \)?

Given that the ratio \( S(-4, 5, 1), T(-16, -4, 16) \) and \( U(-24, -10, 26) \) are collinear, calculate the ratio in which \( T \) divides \( SU \).

An equilateral triangle of side 3 units is shown. The vectors \( p \) and \( q \) are as represented in the diagram. What is the value of \( p.q \)?

Convert \( 135^\circ \) into radians and convert \( \frac{2\pi}{3} \) into degrees.

Calculate the distance between the points \((4, -1)\) and \((7, 3)\).

A triangle has vertices \( P(1, 8), Q(-12, -2) \) and \( R(8, -6) \). Calculate the median \( PS \).

The line with equation \( y = 2x \) intersects the circle with equation \( x^2 + y^2 = 5 \) at the points \( J \) and \( K \). What are the \( x \)-coordinates of \( J \) and \( K \)?

A sequence is generated by the recurrence relation \( u_{n+1} = 0.7u_n + 10 \). What is the limit of this sequence as \( n \to \infty \)?

Calculate the shaded area shown in the diagram.