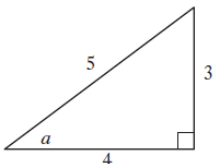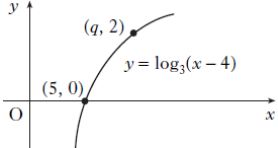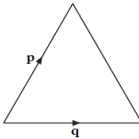**61**
Show that $x = 1$ is a root of
$x^3 + 8x^2 + 11x - 20 = 0$.
Hence factorise $x^3 + 8x^2 + 11x - 20$ fully.

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 $3cos2x + cosx = -1$
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 $cos2a$?

66
$A = 2\pi r^2 + 6\pi r$.
What is the rate of change of A with repect 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 $\int_0^{\frac{\pi}{2}} sin2x + cos2x \ dx$.

70
Write $3cosx° + 4sinx°$ in the form $kcos(x + a)$
for $k > 0$ and $0 \leq x \leq 360$

71 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 $g(f(x))$.

72 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?

73 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.

74 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**?

75 Convert $135°$ into radians and convert $\frac{2\pi}{3}$ into degrees.

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

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

78 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?

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

80 Calculate the shaded area shown in the diagram.