Day 323 **IGCSE 10-a-day**

1 A particle P moves in a straight line. After t seconds its displacement from a fixed point O is s metres, where

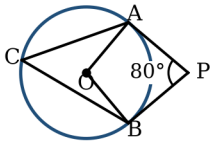
$s = 3t^2 + t + 7 + \frac{16}{t}$ $(t > 0)$

Find (a) the velocity of P, (b) the acceleration of P, when t = 2.

2 E is directly proportional to the square root of v. When v = 4, E = 6.
(a) Find a formula for E in terms of v.
(b) Work out the positive value of v when E = 12.

3 $f(x) = 3x^2 - 1$ and $g(x) = -6x + 8$.
Solve f(x) = g(x).

4 PA and PB are tangents to a circle, centre O. C is a point on the circle. Angle APB = 80°.
(a) Work out the size of angle AOB.
(b) Work out the size of angle ACB.
The diagram is not drawn accurately.



5 Simplify fully $\frac{7x^2y^6 \times 6x^2y^2}{2xy^4}$

Give your answer in the form kx^ay^b

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6 A curve has equation $y = -2x^3 + 3x^2 + 36x + 4$. The point A $(-2, k)$ lies on the curve. Work out the value of k and the gradient of the curve at A.	
7 The distance to a village is 0.55 km, correct to 2 decimal places. Write down the error interval for the distance to a village, using d.	
8 Liam and Leila play a match. The first to win 2 chess games wins the match. The probability that Liam wins any one of the chess games is $\frac{2}{3}$. Work out the probability that the match needs a third one to decide it.	
9 The tangent to the curve $y = x^2 + 4x - 4$ at the point where $x = 2$ meets the axes at A and B. Work out the area of triangle OAB, where O is the origin.	
10 x and y satisfy $x \geq 0$, $y \geq 0$, $4x + 2y \leq 40$ and $5x + 5y \leq 75$. Find the greatest value of $P = 5x + 3y$ and the values of x and y that give it.	