Day 292 **IGCSE 10-a-day**

1 Work out the value of $x^2 - 3yz$ when $x = 3$, $y = 3$ and $z = 2$.

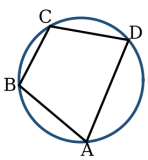
2 The equation of a curve is $y = 2x^{3/2} + 5x - 2\sqrt{x}$. Work out the gradient of the curve at the point where $x = 16$.

3 In a fruit box, the ratio of the number of apples to the number of pears is 4 : 5.
Then 2 apples are removed and 7 pears are removed.
The ratio is now 7 : 8.
How many pears were there at the start?

4 $y = \dfrac{-2x^3 + 2x^2 + 1}{x^2}$

Find $\dfrac{dy}{dx}$.

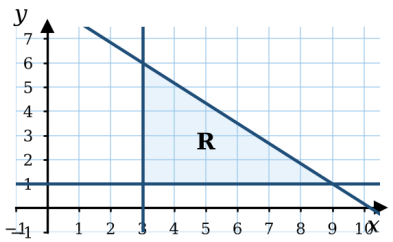
5 A, B, C and D are points on a circle. Angle DAB = (4x)°, angle BCD = (3x + 26)° and angle ABC = (2x + 30)°.
(a) Work out the value of x.
(b) Work out the size of angle ADC.
The diagram is not drawn accurately.



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6 A factory makes 5.2×10^3 bottles each day.
It runs for 2.5×10^1 days.
How many bottles does it make?
Give your answer in standard form.

7 Region R is shaded. Solid boundaries are included, dashed ones are not.
(a) Write down the three inequalities that define R.
(b) How many points with integer coordinates lie in R?



8 The number of bacteria in a culture, N, after t hours is modelled by
$N = -2t^3 + 12t^2 + 4t + 200$ for $0 \leq t \leq 8$
Find the time at which N is increasing most rapidly, and the rate of increase at this time.

9 $f(x) = 3x - 6$ and $g(x) = kx + 6$, where k is a constant.
$fg(x) = gf(x)$ for all values of x.
Find the value of k.

10 OAB is a triangle. OA = **a** and OB = **b**.
M is on OA with OM : MA = 1 : 4. N is on OB with ON : NB = 1 : 1. AN and BM intersect at X.
(a) Find BM in terms of **a** and **b**.
(b) Find OX in terms of **a** and **b**.
The diagram is not drawn accurately.

