Day 82 **IGCSE 10-a-day**

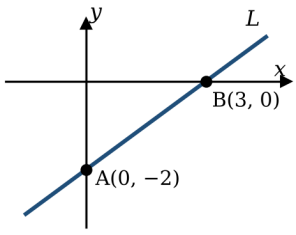
1 $y = 6x^4 - \frac{2}{x}$

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

2 Work out $3\frac{1}{2} \times 2\frac{5}{6} - 1\frac{1}{2}$

Give your answer as a mixed number or a fraction in its simplest form.

3 The diagram shows the straight line L, which passes through the points A and B.
The line M is perpendicular to L and passes through B.
Find the equation of M in the form y = mx + c.



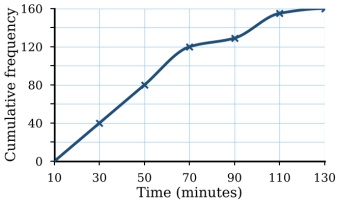
4 The temperature, T °C, of a metal bar t minutes after it is removed from a heat source is modelled by

$T = 20 + \frac{32}{t}$ $(t \geq 1)$

(a) Find $\frac{dT}{dt}$ when t = 2.

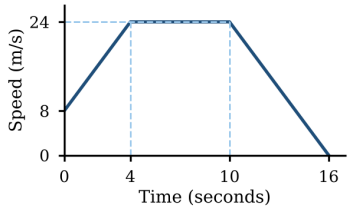
(b) Find the value of t when the temperature is falling at 32 °C per minute.

5 The cumulative frequency graph shows the times, in minutes, taken by 160 runners to finish a race.
(a) Find the median. (b) Find the interquartile range.
(c) How many runners took more than 70?



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6 The graph shows the speed of a car during 16 seconds.
(a) Work out the acceleration during the first 4 seconds.
(b) Work out the average speed over the whole 16 seconds.



7 A rectangle has length 9.8 cm and width 11.1 cm, each correct to 1 decimal place.
(a) Work out the upper bound of the area.
(b) Work out the lower bound of the perimeter.

8 ABCD is a rectangle with AB = 5 cm and AD = 9 cm.
A point P inside the rectangle is such that AP ≤ 4 cm and P is nearer to AB than to AD.
Work out the area of the region in which P can lie. Give your answer in terms of π.

9 a = 55.9 and b = 20.7, both correct to 3 significant figures.
Work out a × b.
Write down your answer to a suitable degree of accuracy.
You must show your working and give a reason for your answer. (Calculator)

10 A particle P moves in a straight line. After t seconds its displacement from a fixed point O is s metres, where
$s = -t^3 - 2t^2 - 2t \ (t > 0)$
Find (a) the velocity of P, (b) the acceleration of P, when t = 1.