Day 163	IGCSE 10-a-day
1 FitLife has a joining fee of £5 plus £5.50 per month. GymNow has a joining fee of £1 plus £6 per month. (a) Work out the number of months for which the two costs are the same. (b) Which is cheaper for 13 months, and by how much?	
2 $y = x^3 - 6x^2 + 7x + 3$ (a) Find $\frac{d^2y}{dx^2}$. (b) Find the value of x for which $\frac{d^2y}{dx^2} = 0$, and work out the gradient of the curve at this value of x.	
3 A bag contains counters. $\frac{1}{3}$ of the counters are red and $\frac{1}{8}$ of the counters are blue. The rest of the counters, 26 of them, are green. How many counters are in the bag?	
4 $y = (\sqrt{x} - 1)(\sqrt{x} + 1)$ Find $\frac{dy}{dx}$. Give each term of your answer in the form ax^n.	
5 y is directly proportional to the square of x and inversely proportional to z. When x = 8 and z = 5, y = 128. Find y when x = 6 and z = 2.	

Day 163 **IGCSE 10-a-day**

6 $y = 2x^3 + 12x^2 + 18x - 6$

(a) Show that there is a stationary point at $x = -3$.

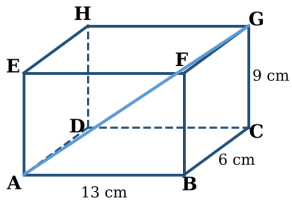
(b) By finding the gradient when $x = -\frac{7}{2}$ and when $x = -\frac{5}{2}$, decide whether it is a maximum or a minimum.

7 ABCDEFGH is a cuboid. AB = 13 cm, BC = 6 cm and CG = 9 cm.

(a) Work out the length of AG.

(b) Work out the size of angle GAB.

Give answers to 3 significant figures or 1 decimal place. (Calculator)

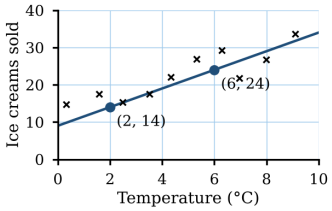


8 The scatter graph shows temperature (x) and ice creams sold (y).

The line of best fit passes through (2, 14) and (6, 24).

(a) Find its equation in the form y = mx + c.

(b) Explain what its gradient tells you.



9 OA = **a** and OB = **b**.

OP = 4**a** + 3**b**, OQ = 9**a** + 6**b** and OR = 24**a** + 15**b**.

(a) Show that P, Q and R lie on a straight line.

(b) Work out the ratio PQ : QR in its simplest form.

10 E is directly proportional to the square of v.

When v = 3, E = 18.

(a) Find a formula for E in terms of v.

(b) Work out the value of E when v = 10.