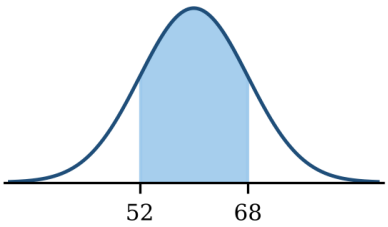
Day 231	A Level Maths: B Tier 10-a-day

1 Solve $3x - 4 \leq -3x - 9$.

2 A coin is dropped from rest from the top of a cliff, 78.4 m above the ground.
Take $g = 9.8$ m s^{-2}.
Find (a) the time taken to reach the ground, (b) its speed on landing.

3 Prove that $(n + 3)^2 - (n - 3)^2$ is a multiple of 12 for all integer values of n.

4 $X \sim N(60, 8^2)$. The shaded area on the diagram represents the probability that X lies between two values.
Find this probability to 3 significant figures.

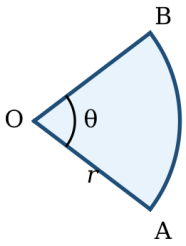


5 The mass of a radioactive sample, M grams, after t days is $M = 60\, e^{-0.2t}$.
Find (a) the half-life, (b) the rate of decrease in mass when $t = 5$, each to 3 s.f.

Day 231 **A Level Maths: B Tier 10-a-day**

6 $X \sim B(7, 0.5)$ and $Y \sim B(9, 0.1)$ are independent.
Find $P(X = 3 \text{ and } Y \leq 1)$, to 3 significant figures.

7 The diagram shows a sector OAB of a circle with centre O, radius 13 cm and angle 1.1 radians.
Find (a) the arc length AB, (b) the area of the sector.



8 Express $\frac{-2x + 2}{(x + 1)(x - 3)}$ in partial fractions.

9 Line l_1: $\mathbf{r} = \begin{pmatrix} 8 \\ 4 \\ 2 \end{pmatrix} + \lambda \begin{pmatrix} -2 \\ -2 \\ 0 \end{pmatrix}$.
Line l_2: $\mathbf{r} = \begin{pmatrix} 2 \\ -2 \\ 2 \end{pmatrix} + \mu \begin{pmatrix} 1 \\ -2 \\ 0 \end{pmatrix}$.
Show that l_1 and l_2 intersect and find the point.

10 A uniform rod AB of length 3 m and mass 3 kg is hinged at A and held horizontal by a light string attached at B.
The string makes an angle θ with the rod, where $\sin\theta = \frac{3}{5}$. Take $g = 9.8$ m s^{-2}. Find the tension in the string.