Day 123	S Tier 10-a-day

1 Simplify $\frac{3}{2+\sqrt{2}} - \frac{1}{2-\sqrt{2}}$

Give your answer with a rational denominator.

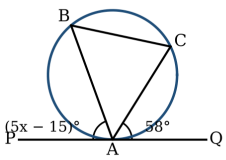
2 The probability that the 8:15 train is late on any day is $\frac{1}{5}$.

Events on different occasions are independent.
Work out the smallest number of days needed so that the probability of this happening at least once is greater than 0.75. (Calculator)

3 Write $\sqrt{18} - \sqrt{32} + \sqrt{50}$ in the form $a\sqrt{2}$ where a is an integer.

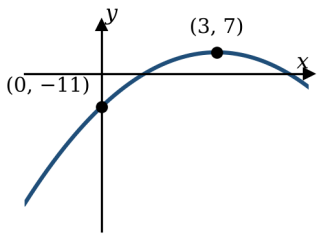
4 (a) Write $x^2 - 4x - 4$ in the form $(x + p)^2 + q$
(b) Write down the coordinates of the turning point of the curve $y = x^2 - 4x - 4$

5 PAQ is a tangent to the circle at A. B and C are points on the circle. Angle PAB = $(5x - 15)°$, angle ACB = $(2x + 36)°$ and angle CAQ = 58°.
(a) Work out the value of x.
(b) Work out the size of angle BAC.
The diagram is not drawn accurately.

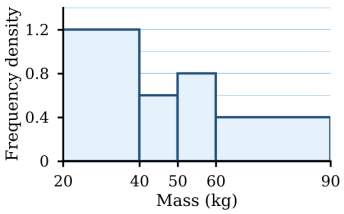


Day 123 **S Tier 10-a-day**

6 The diagram shows a sketch of a quadratic curve with a turning point at (3, 7).
The curve crosses the y-axis at (0, −11).
Find an equation of the curve.
Give your answer in the form $y = ax^2 + bx + c$.



7 The histogram shows the masses of parcels delivered by a courier.
(a) Work out the total number of parcels.
(b) Estimate the number of parcels with a mass between 35 kg and 45 kg.



8 The graph of y = f(x) has a minimum point at (−2, 6).
Write down the coordinates of the turning point of the graph of
(a) y = 3f(x)
(b) y = 2f(−x)

9 Grace invested £16,000 in a savings account for 2 years.
Compound interest was paid at a fixed rate per year.
At the end of the 2 years the account held £18,662.40.
Work out the annual rate of interest.
(Calculator)

10 Show algebraically that the difference between the squares of any two odd numbers is a multiple of 8.