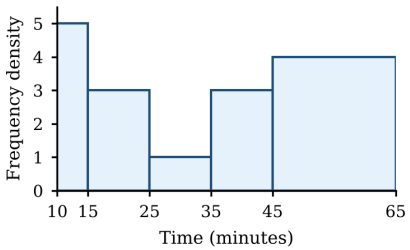
Day 247 **A Level Maths: B Tier 10-a-day**

1 For 12 pairs of values, $\bar{x} = 10$, $\bar{y} = 40$, $S_{xx} = 80$ and $S_{xy} = 200$.
(a) Find the regression line of y on x in the form $y = a + bx$.
(b) Estimate y when $x = 14$.

2 (a) Write $3x^2 + 30x + 79$ in the form $a(x + p)^2 + q$.
(b) Write down the coordinates of the minimum point of $y = 3x^2 + 30x + 79$.

3 A sector of a circle has radius 7 cm and area $\frac{49\pi}{12}$ cm^2.
Find the angle of the sector in degrees.

4 The histogram shows the times taken by a group of people to complete a task.
Estimate the number of people who took between 10 and 18 minutes.



5 A particle moving in a straight line with constant acceleration increases its speed from 15 m s^{-1} to 23 m s^{-1} while covering 76 m.
Find (a) the acceleration, (b) the time taken.

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6 The circle C has equation $(x - 4)^2 + (y + 1)^2 = 65$. The point P(11, 3) lies on C. Find an equation of the tangent to C at P, in the form $ax + by + c = 0$ with integer a, b, c.	
7 Differentiate $y = 2 \cot x$ with respect to x, and find the exact gradient when $x = \frac{\pi}{4}$.	
8 Express $\frac{-3x + 3}{(2x - 3)(x - 2)}$ in partial fractions.	
9 A particle moves along a straight line so that its displacement from O after t s is $s = 3t^3 + 3t^2$ metres. Find (a) the average velocity over the first 4 seconds, (b) the velocity at t = 4.	
10 Line l_1: $\mathbf{r} = \begin{pmatrix} 6 \\ 0 \\ -2 \end{pmatrix} + \lambda \begin{pmatrix} 2 \\ -1 \\ -2 \end{pmatrix}$. Line l_2: $\mathbf{r} = \begin{pmatrix} 4 \\ 0 \\ 0 \end{pmatrix} + \mu \begin{pmatrix} -2 \\ 2 \\ 2 \end{pmatrix}$. Show that l_1 and l_2 intersect and find the point.	