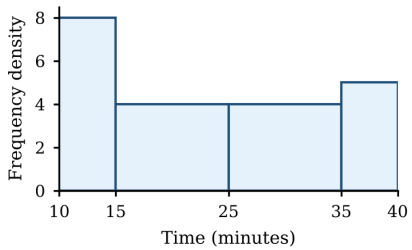
Day 136 **A Level Maths: B Tier 10-a-day**

1 Solve $-3 < 3x + 2 < 2$.

2 For 14 pairs of values, $\bar{x} = 20$, $\bar{y} = 18$, $S_{xx} = 50$ and $S_{xy} = -25$.
(a) Find the regression line of y on x in the form $y = a + bx$.
(b) Estimate y when $x = 24$.

3 A particle has velocity $(-\mathbf{i})$ m s^{-1} at time $t = 0$ and moves with constant acceleration $(-\mathbf{i} - 2\mathbf{j})$ m s^{-2}.
Find its velocity and speed when $t = 2$.

4 The histogram shows the times taken by a group of people to complete a task.
Estimate the number of people who took between 15 and 29 minutes.

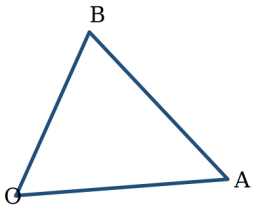


5 Solve $8\cos^2 x - 10\sin x - 11 = 0$ for $0 \leq x \leq 360°$,
giving answers to 1 d.p. where necessary.

Day 136 **A Level Maths: B Tier 10-a-day**

6 (a) Expand $(9 + 3x)^{\frac{3}{2}}$ in ascending powers of x up to and including the term in x^3.
(b) State the range of values of x for which the expansion is valid.

7 In triangle OAB, OA = a and OB = b. M lies on AB with AM : MB = 3 : 1, and N lies on OB with ON : NB = 1 : 3.
Find OM and NM in terms of a and b.



8 The line $12x + 5y = k$ is a tangent to the circle $(x + 2)^2 + (y - 3)^2 = 169$.
Find the two possible values of k.

9 (a) Write $15\cos\theta + 8\sin\theta$ in the form $R\cos(\theta - \alpha)$, with $R > 0$ and $0 < \alpha < 90°$.
(b) Hence find its maximum value and the smallest $\theta \geq 0$ at which it occurs. Give α to 1 d.p.

10 A particle of mass 10 kg is suspended in equilibrium by two light strings attached to a horizontal ceiling. The strings make angles α and β with the ceiling, where $\tan\alpha = \frac{4}{3}$ and $\tan\beta = \frac{3}{4}$.
Take $g = 9.8\ \text{m s}^{-2}$.
Find the tension in each string.