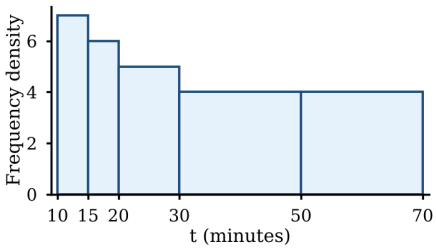
Day 332 **A Level Maths: A Tier 10-a-day**

1 The 4th term of an arithmetic sequence is 1 and the 8th term is 13.
Find the first term and common difference, and the sum of the first 15 terms.

2 The histogram shows the waiting times, t (in minutes), of a sample.
(a) How many were in the class $50 \leq t < 70$?
(b) Estimate how many had $45 < t < 55$.



3 The curve $y = f(x)$ has a maximum point at (2, 5).
Find the coordinates of the corresponding point on:
(a) $y = 3f(x)$
(b) $y = f(x) + 2$
(c) $y = f(4x)$

4 $|a| = 5$, $|b| = 4$ and the angle between a and b is 150°.
Find the exact values of $a \cdot b$ and $|a + b|$.

5 A stone is projected vertically upwards from the ground. It passes a ledge 1 s after projection and again 4 s after projection. Find (a) the speed of projection, (b) the height of the ledge, (c) the greatest height. Take $g = 9.8$.

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6 A curve has equation $3x^2y - y^3 - 4x = -2$. Find $\frac{dy}{dx}$ in terms of x and y, and the gradient of the normal at $(1, -2)$.	
7 A circle passes through A(11, 9) and B(−6, 16). Its centre lies on the line $y = 4$. Find the equation of the circle.	
8 Solve $4\text{cosec}^2\,\theta - 18\cot\theta + 14 = 0$ for $0° < \theta < 360°$. Give answers to 1 d.p.	
9 Ball A is dropped from rest 39.2 m above the ground. At the same instant ball B is projected upwards at 39.2 m s^{-1} from the ground directly below A. Find (a) the time when they collide, (b) the height of the collision. Take $g = 9.8$.	
10 X ~ B(35, p). H_0: $p = 0.4$ is tested against H_1: $p > 0.4$ using a 5% significance level. (a) Find the critical region. (b) State the probability of a Type I error. (c) Find the probability of a Type II error when $p = 0.6$ (3 s.f.).	