

Solutions

2.1 $4 \times 3.5 = 14$.

2.2 $50/5 = 10$.

2.3 Densities: $9/6 = 1.5$, $10/6 \approx 1.67$, $12/12 = 1$ – the 6–12 class.

2.4 $0.4 \times 0.6 + 0.6 \times 0.4 = 0.48$.

2.5 Neither = $50 - (30 + 24 - 10) = 6$; $P = 6/50 = 3/25$.

3.1 (a) Midpoints 5, 15, 25, 45: $(40 + 180 + 375 + 675)/50 = 1270/50 = 25.4$ minutes.
(b) The claim confuses frequency with typicality – 30–60 TIES 20–30 on frequency (15 each), its density is far lower (0.5 vs 1.5), and the estimated mean is 25.4, inside 20–30. The wider class merely collects many patients across a long range.

3.2 (a) Cumulative frequencies 8, 20, 35, 50 at upper boundaries 10, 20, 30, 60 – the plotted points are (10, 8), (20, 20), (30, 35), (60, 50). (b) The 25th patient lies between 20 (cumulative 20) and 30 (cumulative 35): $20 + 10 \times \frac{5}{15} \approx 23.3$ minutes. (c) At 25 minutes – halfway through the 20–30 class (width 10, frequency 15) – the cumulative frequency is $20 + 15 \times \frac{5}{10} = 27.5$, so about $50 - 27.5 = 22.5$: roughly 23 patients waited more than 25 minutes.

3.3 (a) With replacement: $P(\text{no gold}) = \frac{5}{8} \times \frac{5}{8} = \frac{25}{64}$, so $P(\text{at least one gold}) = \frac{39}{64}$. (b) Without: $P(\text{no gold}) = \frac{5}{8} \times \frac{4}{7} = \frac{20}{56} = \frac{5}{14}$, so $P(\text{at least one gold}) = 1 - \frac{5}{14} = \frac{9}{14}$. (c) After a non-gold counter is removed, 3 of the remaining 7 are gold – a better chance ($\frac{3}{7}$) than the $\frac{3}{8}$ with replacement – so the no-gold path got harder ($\frac{5}{14} < \frac{25}{64}$) and drawing at least one gold became likelier. Local review guidance: the correct strand tool chosen (density, midpoints, ogive read, complement); exact values with units; comment questions answered with a number, not an opinion. This is authored classroom guidance.