

Geometric Probability and Conditional Probability: math test solutions, Grade 10 – download the PDF

Test solutions with the detailed point scale. Add up your points and spot what to review.

Suggested time: 45 minutes. Out of 20 points. Calculator allowed only when the problem says so.

1 Counting

/ 3 pts

(a) Order matters: ${}_9P_2 = 9 \cdot 8 = 72$. (1 pt)

(b) Order does not matter: ${}_9C_3 = \frac{9 \cdot 8 \cdot 7}{6} = 84$. (1 pt)

(c) In (a) the roles are different, so “Ann then Bo” and “Bo then Ann” are different outcomes; in (b) a team is the same whatever the order. (1 pt)

2 Geometric probability

/ 4 pts

(a) Circle: 100π . Board: $40 \cdot 30 = 1200$. $P = \frac{100\pi}{1200} = \frac{\pi}{12} \approx 0.262$. (2 pts)

(b) $1 - \frac{\pi}{12} \approx 0.738$. (1 pt)

(c) The cycle lasts $40 + 5 + 35 = 80$ s, so $P = \frac{35}{80} = \frac{7}{16}$. (1 pt)

3 Walking or riding

/ 4 pts

(a) Walks: 48; rides: 72; Grade 9: 60; Grade 10: 60. (1 pt)

(b) $P(\text{walks}) = \frac{48}{120} = \frac{2}{5}$ (0.5 pt). $P(\text{walks} \mid \text{Grade 10}) = \frac{30}{60} = \frac{1}{2}$ (1 pt).

(c) $P(\text{walks} \cap \text{Grade 10}) = \frac{30}{120} = 0.25$, while $\frac{2}{5} \cdot \frac{1}{2} = 0.2$. They differ, so the events are not independent. (1.5 pts)

4 Union and complement

/ 3 pts

(a) $0.55 + 0.4 - 0.25 = 0.7$. (1 pt)

(b) $1 - 0.7 = 0.3$. (1 pt)

(c) $\frac{0.25}{0.4} = 0.625$. (1 pt)

5 Spinner and die

/ 3 pts

(a) $0.3 \cdot 0.5 = 0.15$. (1 pt)

(b) $0.3 + 0.5 - 0.15 = 0.65$. (1 pt)

(c) $1 - 0.7^2 = 1 - 0.49 = 0.51$. (1 pt)

6 Draws without replacement

/ 3 pts

(a) $\frac{4}{10} \cdot \frac{3}{9} = \frac{12}{90} = \frac{2}{15}$. (1.5 pts)

(b) After a yellow is removed, 4 of the 9 balls are green: $\frac{4}{9}$. (0.5 pt)

(c) $2 \cdot \frac{4}{10} \cdot \frac{6}{9} = \frac{48}{90} = \frac{8}{15}$. (1 pt)



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