

Problem 1 — Rolling two dice (answer to two decimal places)

Given: Two fair dice are rolled once. Total equally likely outcomes = $6 \times 6 = 36$.

List of relevant counts (ordered pairs where needed):

- Sum = 9: outcomes $(3, 6), (4, 5), (5, 4), (6, 3) \rightarrow 4$ outcomes.

$$P(\text{sum} = 9) = \frac{4}{36} = \frac{1}{9} \approx 0.111111 \Rightarrow \boxed{0.11}$$

(a)	0.11
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- Sum = 7 or 11:

Sum 7: $(1, 6), (2, 5), (3, 4), (4, 3), (5, 2), (6, 1) \rightarrow 6$ outcomes.

Sum 11: $(5, 6), (6, 5) \rightarrow 2$ outcomes.

Total = $6 + 2 = 8$ outcomes.

$$P(7 \text{ or } 11) = \frac{8}{36} = \frac{2}{9} \approx 0.222222 \Rightarrow \boxed{0.22}$$

(b)	0.22
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- Doubles (both dice same): $(1, 1), (2, 2), \dots, (6, 6) \rightarrow 6$ outcomes.

$$P(\text{doubles}) = \frac{6}{36} = \frac{1}{6} \approx 0.166667 \Rightarrow \boxed{0.17}$$

(c)	0.17
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- Sum less than 9 (sums 2 through 8). Count complements: sums ≥ 9 are 9, 10, 11, 12 with counts 4, 3, 2, 1 total = 10. So less than 9: $36 - 10 = 26$ outcomes.

$$P(\text{sum} < 9) = \frac{26}{36} = \frac{13}{18} \approx 0.722222 \Rightarrow \boxed{0.72}$$

(d)		0.72	
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- Sum ≥ 10 (i.e., 10,11,12): counts $3 + 2 + 1 = 6$ outcomes.

$$P(\text{sum} \geq 10) = \frac{6}{36} = \frac{1}{6} \approx 0.166667 \Rightarrow \boxed{0.17}$$

(e)		0.17	
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Problem 2 — Distribution of CEO ages (answer to two decimal places)

From the sheet the age-frequency table is (frequencies sum to 100):

21–30: 1

31–40: 8

41–50: 27

51–60: 29

61–70: 24

71–up: 11.

Total CEOs = $1 + 8 + 27 + 29 + 24 + 11 = 100$. So probability = frequency / 100.

a. Between 31 and 40 \rightarrow frequency = 8

$$P(31\text{--}40) = \frac{8}{100} = 0.08 \Rightarrow \boxed{0.08}$$

(a)		0.08	
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b. Under 31 \rightarrow only 21–30 group (frequency = 1)

$$P(\text{under } 31) = \frac{1}{100} = 0.01 \Rightarrow \boxed{0.01}$$

(b)		0.01	
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c. Over 30 and under 51 → groups 31–40 (8) and 41–50 (27) → total 35

$$P(31\text{--}50) = \frac{35}{100} = 0.35 \Rightarrow \boxed{0.35}$$

(c)		0.35	
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d. Under 31 or over 60 → under 31 = 1 (21–30); over 60 = 61–70 (24) + 71-up (11) = 35; total = 36

$$P(\text{under 31 or over 60}) = \frac{36}{100} = 0.36 \Rightarrow \boxed{0.36}$$

(d)		0.36	
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Problem 3 — (same dice questions) write answers as fractions in lowest terms

Using counts from Problem 1 (36 total outcomes):

a. Sum of 9: $\frac{4}{36} = \boxed{\frac{1}{9}}$

b. Sum of 7 or 11: $\frac{8}{36} = \boxed{\frac{2}{9}}$

c. Doubles: $\frac{6}{36} = \boxed{\frac{1}{6}}$

d. Sum less than 9: $\frac{26}{36} = \boxed{\frac{13}{18}}$

e. Sum ≥ 10 : $\frac{6}{36} = \boxed{\frac{1}{6}}$
