Unit 21 · Statistics

HARDER PRACTICE QUESTIONS · ANSWER KEY

Full marks 29

Give the marks for the points in the marking scheme; an answer in other words that says the same is right.

1 A mark read wrongly

ANSWER A · 3

Wrong total: $30 \times 42 = 1260$.
Correct total: $1260 - 46 + 64 = 1278$.
Correct mean: $1278 \div 30 = \mathbf{42.6}$.

MARKING SCHEME

- ✓ The wrong total, 1,260.
- ✓ The correct total, 1,278.
- ✓ 42.6.

2 Two classes together

ANSWER HA · 3

Totals: $20 \times 60 = 1200$ and $30 \times 50 = 1500$. Mean: $\frac{2700}{50} = \mathbf{54}$.

55 would be right only if the classes were the same size. Class B has more students, so the mean is pulled closer to 50.

MARKING SCHEME

- ✓ The totals, 1,200 and 1,500.
- ✓ 54.
- ✓ The classes are of different sizes.

3 Read the pie chart

ANSWER A · 4

i. $360° - 120° - 90° - 72° = \mathbf{78°}$.

ii. $72°$ is one-fifth of $360°$, so the total is $5 \times 12000 = \mathbf{Rs\ 60{,}000}$.

iii. Food $\frac{120}{360} \times 60000 = \mathbf{Rs\ 20{,}000}$, rent **Rs 15,000**, savings **Rs 13,000**.

iv. $\frac{15000}{72000} \times 360° = \mathbf{75°}$.

MARKING SCHEME

- ✓ 78°.
- ✓ Rs 60,000.
- ✓ Rs 20,000, Rs 15,000 and Rs 13,000.
- ✓ 75°.

4 Bigger sector, more people?

ANSWER HA · 3

School A: $\frac{180}{360} \times 400 = 200$ girls. School B: $\frac{120}{360} \times 900 = 300$ girls.

She is wrong: School B has more girls.
A sector shows a **share of the total**, not a number. School A has a larger fraction of girls, but School B has more in all.

MARKING SCHEME

- ✓ 200 and 300 girls.
- ✓ She is wrong.
- ✓ A sector shows a share, and the totals are different.

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5 Which average is fair?

ANSWER A · 3

i. Mean: $\frac{1{,}84{,}000}{5} =$ **Rs 36,800**. Median: **Rs 16,000**. Mode: **Rs 15,000**.

ii. It is **true** as a mean, but **not fair**: no one but the owner earns near it. One far-out value pulls the mean up, so the median describes the pay better.

MARKING SCHEME

- ✓ Mean Rs 36,800.
- ✓ Median Rs 16,000 and mode Rs 15,000.
- ✓ True, but misleading: the owner's pay pulls the mean up.

6 Spot the error

ANSWER U · 3

The values must be put **in order first**: 2, 3, 4, 6, 7, 9.

The two in the middle are 4 and 6, so the median is $\frac{4+6}{2} =$ **5**.

MARKING SCHEME

- ✓ The mistake: the values aren't in order.
- ✓ The two in the middle are 4 and 6.
- ✓ 5.

7 With an unknown

ANSWER A · 3

The median is the mean of the third and fourth: $\frac{x+x+3}{2} = 16.5$, so $2x + 3 = 33$ and $x =$ **15**.

The values are 11, 14, 15, 18, 22, 25, with a total of 105. Mean: $105 \div 6 =$ **17.5**.

MARKING SCHEME

- ✓ $\frac{x+x+3}{2} = 16.5$.
- ✓ $x = 15$.
- ✓ 17.5.

8 In a real setting

ANSWER A · 2

5 matches: $5 \times 32 = 160$ runs. 6 matches at a mean of 35: $6 \times 35 = 210$ runs.
She needs $210 - 160 =$ **50 runs**.

MARKING SCHEME

- ✓ 160 runs and 210 runs.
- ✓ 50 runs.

9 Think

ANSWER HA · 3

i. Mean **14**, median **13**: both go up by 5.

ii. Mean **18**, median **16**: both double.

iii. Adding 5 to each of the 5 values adds $5 \times 5 = 25$ to the total, and $25 \div 5 = 5$ to the mean.

MARKING SCHEME

- ✓ 14 and 13.
- ✓ 18 and 16.
- ✓ The total grows by 5 for each value, so the mean grows by 5.

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10 Make your own

HA · 2

ANSWER

For example, 3, 3, 5, 8, 11: the total is 30, so the mean is 6; the middle value is 5; and only 3 comes twice.

MARKING SCHEME

- ✓ Five numbers with a total of 30 and a middle value of 5.
- ✓ 3 is the only value that comes most often.

See it at Science Playground

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- **Galton Board** (exhibit): Once the balls have fallen, find the tallest pile: the slot where the most balls landed is the mode of this data.

Marks by level	Knowledge	Understanding	Application	Higher ability	Total
Marks	0	3	15	11	**29**

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