Unit 21 · Presentation of Data

HARDER PRACTICE QUESTIONS · ANSWER KEY

Full marks 35

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

1 Spot the errors

ANSWER U · 4

i. It is the **total of all the frequencies**, the number of things counted: a running total ends with everything added.

ii. **37.5%.** The class has $30 + 50 = 80$ students, so girls are $30 \div 80 \times 100\% = 37.5\%$. 30 is a number of girls, not a percent.

iii. The steepest piece shows the **biggest change** from one dot to the next. The biggest number is the **highest dot**.

iv. **The other way round**: the bars of one group stand side by side with **no gap**, and a gap is left between one group and the next.

MARKING SCHEME

✓ i. The total, the number of things counted.

✓ ii. 37.5% (30 out of 80).

✓ iii. The biggest change; the biggest number is the highest dot.

✓ iv. No gap inside a group, gaps between groups.

2 Work back from the running total

ANSWER A · 4

i. Each frequency is a running total minus the one before it: **2, 4, 5, 8, 4, 2** ($6 - 2 = 4$, $11 - 6 = 5$, $19 - 11 = 8$, $23 - 19 = 4$, $25 - 23 = 2$). Check: $2 + 4 + 5 + 8 + 4 + 2 = 25$.

ii. The last running total: **25 students**.

iii. 11 got 7 or less, so $25 - 11 =$ **14** got 8 or more. (Or $8 + 4 + 2 = 14$.)

iv. **No.** The row for 7 says 11: 11 students got 7 or less, and half of 25 is 12.5. 11 is less than half.

MARKING SCHEME

✓ i. 2, 4, 5, 8, 4, 2.

✓ ii. 25.

✓ iii. 14.

✓ iv. No: 11 is less than half of 25.

3 The shape before the graph

ANSWER A · 4

Take each month from the next:

i. **February to March**, up **3.7 °C** ($17.4 - 13.7$). The other rises are 2.7, 3.1, 2.2, 1.7, 0.1 and 0.1.

ii. **October to November**, down **4.6 °C** ($20.6 - 16.0$).

iii. Kathmandu's: **June to July to August**, up only 0.1 °C each time. Pokhara's: **July to August**, 26.4 °C both, no change at all.

iv. **They never cross**: Pokhara is warmer in every month. The differences are 2.5, 2.5, 2.7, 2.6, 1.9, 1.6, 1.9, 1.8, 1.8, 2.0, 2.4 and 2.5 °C, so they are closest in **June**, **1.6 °C** apart.

(Source: the unit's table, from Wikipedia's climate tables for Kathmandu and Pokhara, 1991–2020 averages, read November 2026.)

MARKING SCHEME

✓ i. February to March, 3.7 °C.

✓ ii. October to November, 4.6 °C.

✓ iii. June to August; Pokhara July to August.

✓ iv. Never cross; closest in June, 1.6 °C.

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4 Judge the graphs

ANSWER U · 4

i. Colors have **no order**, so a line from one color to the next means nothing: draw a **bar graph**.

ii. The scale is **not even**: one square is 10 at the bottom but 40 at the top, so the bars' heights mislead. Every square must stand for the same number.

iii. Without a **key** no one can tell which color is boys and which girls: add one.

iv. **2080 is missing**, but 2081 sits one square after 2079, as if a year had passed. Leave a space for 2080 (or give its sales), so each year is one square apart.

MARKING SCHEME

- ✓ i. No order: a bar graph.
- ✓ ii. Equal steps on the scale.
- ✓ iii. Add a key.
- ✓ iv. Space for the missing year.

5 From tallies to bars

ANSWER A · 4

i.

Way	Section A	Section B
On foot (W)	7	3
Bus (B)	5	8
Bicycle (C)	3	4

The tally marks: 7 is one bundle of five and two more, 8 one bundle and three more, 5 one bundle, and 3 or 4 single marks. Each column adds up to 15.

ii. Three groups (on foot, bus, bicycle), two bars in each, side by side, 1 square for 1 student, with a key.

iii. **On foot**: 7 against 3, a difference of 4 (bus 3, bicycle 1).

iv. **No.** The graph shows only how they come, not how far they live. They may take the bus for other reasons (the route, the weather, their parents' choice); to know the distances, they would have to be asked or measured.

MARKING SCHEME

- ✓ i. 7, 5, 3 and 3, 8, 4.
- ✓ ii. A double bar graph with a key.
- ✓ iii. On foot, 4.
- ✓ iv. No: the data says nothing about distance.

6 Difference or times?

ANSWER HA · 4

i. The differences are 226, 407, 557, 496, 427 and 116 mm: **July**, **557 mm** more (941 − 384).

ii. 355 ÷ 129 ≈ 2.8, 648 ÷ 241 ≈ 2.7, 941 ÷ 384 ≈ 2.5, 839 ÷ 343 ≈ 2.4, 635 ÷ 208 ≈ 3.1, 159 ÷ 43 ≈ 3.7: **October**, about **3.7 times**.

iii. 159 − 43 = 116 mm more, compared with Kathmandu's 43: 116 ÷ 43 × 100% ≈ **270%** more.

iv. **i** is easy: the difference is the gap between the tops of a pair of bars, and July's gap is clearly the biggest. **ii** is hard: October's bars are both short, so the gap looks small, yet the taller bar is almost 4 times the shorter. Finding "how many times" needs dividing, which the eye doesn't do.

(Source: as in Question 3.)

MARKING SCHEME

- ✓ i. July, 557 mm.
- ✓ ii. October, about 3.7 times.
- ✓ iii. About 270%.
- ✓ iv. The difference is seen as the gap; "times" needs dividing.

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7 Two schools, one graph

ANSWER A · 4

i. For example, the Y-axis from 100 to 190 with a zigzag at the bottom, 1 square for 5 students; two lines in two styles, with a key.
ii. **2079**: both have **160 students**. Before it School B had more, after it School A.
iii. School B was ahead by 60, 40, 15, then 0: the gap shrank by 20, 25 and 15 (after 2079 School A pulls ahead). Most between **2077 and 2078**, by **25**.
iv. **School A**, 170 against 150: $20 \div 150 \times 100\% \approx$ **13.3%** more than School B.

MARKING SCHEME

✓ i. Both lines, a broken scale, a key.
✓ ii. 2079, 160 each.
✓ iii. 2077 to 2078.
✓ iv. School A, about 13.3% more.

8 Think: the same numbers, two pictures

ANSWER HA · 4

i. The price rose Rs. 10. Graph P: $10 \div 10 =$ **1 square**. Graph Q: $10 \div 1 =$ **10 squares**.
ii. **No**: the same Rs. 10 on both; only the picture changed. $10 \div 60 \times 100\% \approx$ **16.7%**.
iii. The bars show only the part above 55: $70 - 55 = 15$ and $60 - 55 = 5$, so week 5's bar looks **3 times** as tall. Really $70 \div 60 \approx$ **1.2 times**.
iv. A bar's **whole height** is read as its number, so cutting off the bottom makes bars wrongly look many times as big. A line graph is read by its **ups and downs** from dot to dot, which a broken scale shows truly, and bigger; the zigzag warns that the bottom is left out.

MARKING SCHEME

✓ i. 1 square and 10 squares.
✓ ii. No; about 16.7%.
✓ iii. Looks 3 times; really about 1.2 times.
✓ iv. Bars are read by their whole height; a line by its changes.

9 Make your own

ANSWER A · 3

For example:

i. The height of a plant every week for six weeks: a line graph, since the weeks come in order. The boys and girls who like each of four games: a multiple bar graph, two sets compared for things with no order.
ii. Frequencies 3, 5, 6, 4, 2; cumulative 3, 8, 14, 18, 20.
iii. The water in a tank through a day: filling slowly in the morning, full and unused at midday, then quickly emptied in the evening.

Any correct answers are right.

MARKING SCHEME

✓ i. One of each, with a reason.
✓ ii. Frequencies adding to 20 and a correct running total.
✓ iii. A graph of that shape and a sensible meaning.

Marks by level	Knowledge	Understanding	Application	Higher ability	Total
Marks	0	8	19	8	**35**

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