Unit 8 · Unitary Method

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. **Rs 25.** The price of one is the price **divided by** the number of pens: $75 \div 3 = 25$. She divided the wrong way round.

ii. **10 days.** More workers finish **sooner**: indirect variation. The wall is $8 \times 15 = 120$ worker-days, and $120 \div 12 = 10$. She treated it as direct.

iii. **2 hours.** Faster means less time: the trip is $30 \times 4 = 120$ km, and $120 \div 60 = 2$.

iv. **60 days.** One person alone takes **longer**: $12 \times 5 = 60$ days. She divided where she should have multiplied.

MARKING SCHEME

- ✓ i. Rs 25: divide the price by the number.
- ✓ ii. 10 days: indirect, not direct.
- ✓ iii. 2 hours: faster takes less time.
- ✓ iv. 60 days: one person takes longer.

2 Which way?

ANSWER U · 4

a. **Direct.** Twice the tickets bring twice the money; money ÷ tickets is always Rs 450.

b. **Indirect.** Twice as fast takes half the time; speed × time is always the distance.

c. **Neither.** Both go up, but not in the same proportion: a side of 2 cm gives 4 cm^2, a side of 4 cm gives 16 cm^2. Twice the side gives **four** times the area.

d. **Indirect.** Twice the children get half as many each; children × laddus each is always 120.

MARKING SCHEME

- ✓ a. Direct, with a reason.
- ✓ b. Indirect, with a reason.
- ✓ c. Neither: twice the side gives four times the area.
- ✓ d. Indirect, with a reason.

3 The printing press

ANSWER A · 4

i. $1440 \div 40 =$ **36 copies** a minute.

ii. 2 hours 15 minutes is 135 minutes: $36 \times 135 =$ **4,860 copies**.

iii. $9000 \div 36 = 250$ minutes = **4 hours 10 minutes**.

iv. Two presses take half the time: $250 \div 2 = 125$ minutes = **2 hours 5 minutes**. (Copies and minutes vary directly; presses and minutes indirectly.)

MARKING SCHEME

- ✓ i. 36 copies a minute.
- ✓ ii. 4,860 copies.
- ✓ iii. 4 hours 10 minutes.
- ✓ iv. 2 hours 5 minutes.

4 Fodder for the cows

ANSWER

i. $18 \times 20 =$ **360 cow-days**.

ii. In 5 days 18 cows eat $18 \times 5 = 90$, so $360 - 90 =$ **270 cow-days** are left.

iii. 9 cows: $270 \div 9 =$ **30 more days**, 35 days in all instead of 20.

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iv. 24 cows: 270 ÷ 24 = 11.25: **11 more whole days**, with a quarter of a day's fodder left over. HA · 4

MARKING SCHEME

- ✓ i. 360 cow-days.
- ✓ ii. 270 cow-days left.
- ✓ iii. 30 more days.
- ✓ iv. 11 whole days.

5 The momo stall

ANSWER A · 4

i. 1 momo takes 1.5 ÷ 120 = 0.0125 kg, so 200 momos take 0.0125 × 200 = **2.5 kg**.

ii. 1 kg makes 120 ÷ 1.5 = 80 momos, so 4 kg make 320 momos: **32 plates**.

iii. 120 momos are 12 plates, so one plate takes 1.5 ÷ 12 = **0.125 kg** (125 g). It costs 0.125 × 80 = **Rs 10**.

MARKING SCHEME

- ✓ i. 2.5 kg.
- ✓ ii. 32 plates.
- ✓ iii. 0.125 kg a plate.
- ✓ iii. Rs 10 a plate.

6 Building a wall

ANSWER A · 4

i. The wall is 6 × 10 = 60 mason-days. 4 masons: 60 ÷ 4 = **15 days**; 12 masons: 60 ÷ 12 = **5 days**; 3 days: 60 ÷ 3 = **20 masons**.

ii. 60 ÷ 7 = 8.57… masons. A part of a mason can't be hired, and 8 masons take 60 ÷ 8 = 7.5 days, too long. So **9 masons** are needed (they take about 6.7 days).

MARKING SCHEME

- ✓ i. 15 days.
- ✓ i. 5 days.
- ✓ i. 20 masons.
- ✓ ii. 9 masons: round up, since 8 take 7.5 days.

7 The best buy

ANSWER A · 4

i. 500 g: 360 ÷ 5 = **Rs 72**; 200 g: 150 ÷ 2 = **Rs 75**; 1 kg: 740 ÷ 10 = **Rs 74**.

ii. The **500 g packet**. A kilogram costs Rs 720 in it and Rs 750 in the 200 g packets: **Rs 30 less**. The biggest packet is not always the cheapest.

MARKING SCHEME

- ✓ i. 500 g: Rs 72.
- ✓ i. 200 g: Rs 75.
- ✓ i. 1 kg: Rs 74.
- ✓ ii. The 500 g packet, Rs 30 a kilogram less.

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8 Make your own

ANSWER A · 3

For example:

i. "4 notebooks cost Rs 180. What do 7 notebooks cost?" 1 notebook costs $180 \div 4 = 45$, and 7 cost $45 \times 7 =$ Rs 315.

ii. "4 people paint a house in 9 days. How long do 6 people take?" $4 \times 9 = 36$ person-days, and $36 \div 6 = 6$ days.

iii. A child's weight and her age; the length of a phone call and the size of a phone bill with a fixed monthly charge.

Any correct answers are right.

MARKING SCHEME

- ✓ i. A direct question with Rs 45 for one, solved.
- ✓ ii. An indirect question with 36 person-days, solved.
- ✓ iii. Two quantities that rise together, not in the same proportion.

9 Think: where the method breaks

ANSWER HA · 4

i. One tailor takes 180 minutes, so 180 tailors take $180 \div 180 =$ **1 minute**.

ii. One kurta can't be shared among 180 people: they would only get in each other's way, and some steps (cutting, then stitching) must be done one after another. The method works only while the work can really be shared.

iii. **5 minutes**: more singers don't sing faster. **Neither.**

iv. That every person works **at the same speed**, all the time, and that the work can be **split up** among them in any way, so twice the people do it in half the time.

MARKING SCHEME

- ✓ i. 1 minute.
- ✓ ii. The work can't be shared that finely.
- ✓ iii. 5 minutes: neither.
- ✓ iv. Same speed, work that can be split.

See it at Science Playground

Exhibits and plants at the center, Bhaktapur, that go with this unit. Book a class visit at science-playground.com/booking.

- **Build a Gear Train** (exhibit): Turn a big gear twice as many times and the small gear meshed with it also turns twice as many times: the turns of the two vary directly.
- **Walk Your Weight** (exhibit): Read the marks on the plank: 15 is far from the pivot and 90 close to it. Weight × distance from the pivot stays the same, an indirect variation.

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

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