Unit 16 · Equation

HARDER PRACTICE QUESTIONS · ANSWER KEY

Full marks 34

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

1 Mother and daughter

ANSWER A · 4

i. Mother: $3x + 2$ years.

ii. $x + 3x + 2 = 46$, which is $4x + 2 = 46$.

iii. $4x = 44$ [$-$ 2 on both sides], $x = 11$ [$\div$ 4 on both sides].

Barsha is **11 years** old and her mother is $3 \times 11 + 2 =$ **35 years** old. Check: $11 + 35 = 46$. ✓

MARKING SCHEME

✓ Mother $3x + 2$.

✓ $4x + 2 = 46$.

✓ $x = 11$.

✓ Mother 35, checked.

2 Three numbers in a row

ANSWER HA · 3

Let the smallest be x. The next two are $x + 1$ and $x + 2$.

$x + x + 1 + x + 2 = 72$, so $3x + 3 = 72$.

$3x = 69$ [$-$ 3 on both sides], $x = 23$ [$\div$ 3 on both sides].

The numbers are **23, 24 and 25**. Check: $23 + 24 + 25 = 72$. ✓

MARKING SCHEME

✓ The three numbers as x, $x + 1$, $x + 2$.

✓ $3x + 3 = 72$.

✓ 23, 24 and 25.

3 Bags on a balance

ANSWER A · 3

i. $3x + 2 = x + 10$.

ii. $2x + 2 = 10$ [take 1 bag, x, off both pans]. $2x = 8$ [$-$ 2 on both sides]. $x = 4$ [$\div$ 2 on both sides].

One bag is **4 kg**. Check: left $3 \times 4 + 2 = 14$, right $4 + 10 = 14$. ✓

MARKING SCHEME

✓ $3x + 2 = x + 10$.

✓ $2x = 8$.

✓ 4 kg, checked.

4 Spot the error

ANSWER U · 3

i. The first step. 5 is **taken away** from $4x$, so to undo it he must **add** 5 to both sides, not take 5 away.

ii. $4x = 23 + 5 = 28$ [+ 5 on both sides], $x = 7$ [$\div$ 4 on both sides].

iii. With his answer, $4x$ is 18 (4 lots of $4\frac{2}{4}$), and $18 - 5 = 13$, not 23. With $x = 7$: $4 \times 7 - 5 = 28 - 5 = 23$. ✓

MARKING SCHEME

✓ He took away 5 instead of adding it.

✓ $x = 7$.

✓ The check: 13 is not 23, but 7 gives 23.

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5 Which equations fit?

ANSWER A · 4

B and C fit. He spent $200 - 30 = 170$, so B. What he spent and his change make the 200 he paid, so C. A forgets the change; D adds the pen and the change to the 200 instead of taking them away.
From B: $3x = 150$ [$-$ 20 on both sides], $x = 50$ [$\div$ 3 on both sides]. An exercise book costs **Rs. 50**.
Check: $3 \times 50 + 20 + 30 = 200$. ✓

MARKING SCHEME

- ✓ B fits.
- ✓ C fits.
- ✓ A and D don't, with a reason.
- ✓ Rs. 50.

6 Round a garden

ANSWER A · 4

i. Length $x + 4$ m. Perimeter: $x + 4 + x + x + 4 + x = 40$, which is $4x + 8 = 40$.
ii. $4x = 32$ [$-$ 8 on both sides], $x = 8$ [$\div$ 4 on both sides]. The garden is **12 m long** and **8 m broad**.
Check: $2 \times 12 + 2 \times 8 = 40$. ✓
iii. $12 \times 8 =$ **96 sq. m**.

MARKING SCHEME

- ✓ $4x + 8 = 40$.
- ✓ $x = 8$.
- ✓ 12 m by 8 m.
- ✓ 96 sq. m.

7 Not a whole number

ANSWER HA · 3

$4x = 3$ [$-$ 3 on both sides], $x = \frac{3}{4}$ [$\div$ 4 on both sides].

As a decimal: $\frac{3}{4} = \frac{75}{100} =$ **0.75**.

Check: $4x$ is $\frac{3}{4} + \frac{3}{4} + \frac{3}{4} + \frac{3}{4} = \frac{12}{4} = 3$, and $3 + 3 = 6$. ✓

MARKING SCHEME

- ✓ $4x = 3$.
- ✓ $x = \frac{3}{4}$.
- ✓ 0.75.

8 Make your own

ANSWER HA · 3

i. For example $5x + 2 = 2x + 20$. Check: $5 \times 6 + 2 = 32$ and $2 \times 6 + 20 = 32$. ✓ Any equation that 6 makes true, with x on both sides, is right.
ii. For example: "Two friends got the same pocket money, and their grandmother gave them Rs. 15 more. In all they have Rs. 75. How much pocket money did each get?" $2x = 60$, $x = 30$: **Rs. 30** each.

MARKING SCHEME

- ✓ An equation with x on both sides that 6 makes true.
- ✓ A story that matches $2x + 15 = 75$.
- ✓ $x = 30$.

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9 Is it possible?

ANSWER HA · 4

i. **No.** Adding 5 to a whole number gives 5 or more, never 3.

ii. **Yes.** $x = \frac{7}{2} = 3\frac{1}{2}$.

iii. **No.** Take x off both sides: $2 = 3$, which is never true. A number with 2 added can't equal the same number with 3 added.

iv. **Yes.** Both sides are exactly the same, so they balance whatever x is.

MARKING SCHEME

- ✓ i. No, with a reason.
- ✓ ii. Yes, $3\frac{1}{2}$.
- ✓ iii. No, it leaves $2 = 3$.
- ✓ iv. Yes, the two sides are the same.

10 Think: half a brick

ANSWER HA · 3

One pan has two half bricks. The other has one half brick and 1 kg.
Take half a brick off both pans, as you took a bag off each pan: one half brick balances 1 kg.
So the whole brick is $2 \times 1 =$ **2 kg**. Check: half a brick is 1 kg, and $1 + 1 = 2$. ✓

MARKING SCHEME

- ✓ The balance: two half bricks against one half brick and 1 kg.
- ✓ Half a brick weighs 1 kg.
- ✓ The brick weighs 2 kg.

Marks by level	Knowledge	Understanding	Application	Higher ability	Total
Marks	0	3	15	16	**34**

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