

Name _____

Date _____

Stage 7 End-of-unit test 1 — mark scheme

25 questions · 37 marks · calculators are not allowed · allow about 45 minutes

- 1 Work out $8 + (-12)$. [1]

Answer: -4

$8 - 12 = -4$.

- 2 Work out $-6 - (-9)$. [1]

Answer: 3

Subtracting a negative adds: $-6 + 9 = 3$.

- 3 Fill in the missing integer: $_\times 5 = -15$ [1]

Answer: -3

$-15 \div 5 = -3$.

- 4 Fill in the missing integer: $_\div 4 = -8$ [1]

Answer: -32

$-8 \times 4 = -32$.

- 5 Find the lowest common multiple of 6 and 10. [2]

Answer: 30

Multiples of 10: 10, 20, 30 ✓ — 30 is also 6×5 , so the LCM is 30.

- 6 Find the highest common factor of 24 and 40. [2]

Answer: 8

Factors of 24 from the top: 24 ✗, 12 ✗, 8 ✓ ($40 \div 8 = 5$). So the HCF is 8.

- 7 Work out $\sqrt[3]{125} - \sqrt[3]{27}$. [1]

Answer: 2

$\sqrt[3]{125} = 5$ and $\sqrt[3]{27} = 3$, so the answer is 2.

- 8 The cube root of a number is 4. Work out the square root of the number. [2]

Answer: 8

The number is $4^3 = 64$, and $\sqrt{64} = 8$.

- 9 The highest common factor of two numbers is 3 and their lowest common multiple is 18. What is the larger of the two numbers? [1]

Answer: 9

$\text{HCF} \times \text{LCM} = \text{product}$, so the product is $3 \times 18 = 54$. The pair is 6 and 9: $\text{HCF}(6, 9) = 3$ ✓ $\text{LCM}(6, 9) = 18$ ✓ The larger is 9.

- 10 The highest common factor of two numbers is 3 and their lowest common multiple is 18. What is the smaller of the two numbers? [1]

Answer: 6

The pair is 6 and 9, so the smaller is 6.

- 11** The number 3■58 has a digit replaced by ■. The number is divisible by 3. List all the possible values of ■, separated by commas. [2]

Answer: 2, 5, 8

$3 + 5 + 8 = 16$, so $16 + \blacksquare$ must be a multiple of 3: $\blacksquare = 2, 5$ or 8 .

- 12** The product of two integers is -24 and their sum is 5 . What is the larger integer? [1]

Answer: 8

$8 \times (-3) = -24$ and $8 + (-3) = 5$. The larger is 8 .

- 13** The product of two integers is -24 and their sum is 5 . What is the smaller integer? [1]

Answer: -3

The pair is 8 and -3 , so the smaller is -3 .

- 14** A whole number is greater than $22\,222$ and is also divisible by 9 . Find the smallest whole number with this property. [1]

Answer: 22230

Digits of $22\,222$ add to 10 . Counting on, $22\,230$ has digit sum 9 ✓ and $22\,230 \div 9 = 2\,470$.

- 15** Look at this pattern: $2^2 = 4$, $4^2 = 16$, $8^2 = 64$, $16^2 = 256$. Use the pattern to find 32^2 . [2]

Answer: 1024

Each time the base doubles, the answer is multiplied by 4 . $256 \times 4 = 1\,024$, and indeed $32 \times 32 = 1\,024$.

- 16** The temperature at 05:00 is -9°C . By 13:00 it has risen 14°C . What is the temperature at 13:00, in $^\circ\text{C}$? [1]

Answer: 5

$-9 + 14 = 5^\circ\text{C}$.

- 17** A diver descends at 7 m per minute from the surface. What is her depth after 9 minutes? Give a negative number of metres. [1]

Answer: -63

$-7 \times 9 = -63\text{ m}$.

- 18** Two lights flash every 12 seconds and every 16 seconds. They flash together now. After how many seconds do they next flash together? [2]

Answer: 48

$\text{LCM}(12, 16) = 48$ seconds.

- 19** A shopkeeper has 90 apples and 126 pears. She makes identical baskets using all the fruit. What is the greatest number of baskets? [2]

Answer: 18

$\text{HCF}(90, 126) = 18$ baskets.

- 20** Work out $(-2)^3 \times (-5)$. [2]

Answer: 40

$(-2)^3 = -8$ and $-8 \times (-5) = 40$.

- 21 $\sqrt{90}$ lies between which two whole numbers? [1]

- ☐ 8 and 9
☐ 9 and 10
☐ 10 and 11
☐ 11 and 12

Answer: 9 and 10

$81 < 90 < 100$, so $9 < \sqrt{90} < 10$.

- 22 Is 5 148 divisible by 11? [2]

- ☐ Yes
☐ No

Answer: Yes

Odd-position digits $8 + 1 = 9$ and even-position digits $4 + 5 = 9$. The difference is 0, so yes ($5\,148 = 11 \times 468$).

- 23 Find the smallest 3-digit number that is divisible by both 6 and 8. [2]

Answer: 120

It must be a multiple of $\text{LCM}(6, 8) = 24$. Multiples of 24: 24, 48, 72, 96, 120 — the first with three digits is 120.

- 24 A square field has an area of 196 m^2 . What is the length of its perimeter, in metres? [2]

Answer: 56

Side = $\sqrt{196} = 14 \text{ m}$, so the perimeter is $4 \times 14 = 56 \text{ m}$.

- 25 Work out $\sqrt{169} + (-4)^2 - \sqrt[3]{216}$. [2]

Answer: 23

$\sqrt{169} = 13$, $(-4)^2 = 16$ and $\sqrt[3]{216} = 6$, so $13 + 16 - 6 = 23$.

Total: 37 marks