Year 10 maths worksheet

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Name _____ Class _____ Date _____ Score _____ / 24

Non-calculator. Show your working in the space and write each answer in the box. Give fractions in their simplest form.

Example: 15% of 80 = 12. Find 10% (8) and 5% (4), then add them: 8 + 4 = 12.

Section A · Number

1. Write 360 as a product of its prime factors. Give your answer in index form.

Answer

2. Find the highest common factor (HCF) of 84 and 120.

Answer

3. Work out 2 3/4 × 1 1/3. Give your answer as a mixed number.

Answer

4. Write 0.00052 in standard form.

Answer

5. Work out $(3 \times 10^5) \times (4 \times 10^3)$. Give your answer in standard form.

Answer

6. Estimate the value of (6.12 × 39.6) ÷ 0.198 by rounding each number to 1 significant figure.

Answer

7. Increase £240 by 15%.

Answer

8. In a sale, a coat is reduced by 20% to £64. What was the original price?

Answer

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Section B · Algebra

9. Expand and simplify $3(2x - 5) - 2(x - 4)$.

Answer

10. Factorise fully $12x^2 - 18x$.

Answer

11. Solve $5x - 7 = 2x + 11$.

Answer

12. Solve $(x + 4)/3 = 5$.

Answer

13. Expand and simplify $(x + 5)(x - 3)$.

Answer

14. Factorise $x^2 - 7x + 12$.

Answer

15. Find the nth term of the sequence 7, 11, 15, 19, ...

Answer

16. Make r the subject of $A = 3r + p$.

Answer

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Section C · Ratio, geometry, probability and statistics

17. Share £180 in the ratio 2 : 3 : 4.

Answer

18. Find the gradient of the straight line through (1, 3) and (4, 15).

Answer

19. Find the size of each interior angle of a regular hexagon.

Answer

20. A right-angled triangle has shorter sides 9 cm and 12 cm. Find the length of the hypotenuse.

Answer

21. A trapezium has parallel sides 7 cm and 11 cm and a perpendicular height of 5 cm. Find its area.

Answer

22. A circle has radius 5 cm. Find its area. Give your answer in terms of π.

Answer

23. A bag holds only red, blue and green counters. P(red) = 0.35 and P(blue) = 0.4. Find P(green).

Answer

24. The mean of five numbers is 12. Four of the numbers are 8, 10, 15 and 14. Find the fifth number.

Answer

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Check each answer and its method. Equivalent forms are correct unless a question asks for a particular form or degree of accuracy.

Section A · Number

1. **$2^3 \times 3^2 \times 5$**

360 = 2 × 180 = 2 × 2 × 90 = 2 × 2 × 2 × 45 = 2 × 2 × 2 × 3 × 3 × 5.

2. **12**

84 = $2^2 \times 3 \times 7$ and 120 = $2^3 \times 3 \times 5$. The shared factors are $2^2 \times 3 = 12$.

3. **3 2/3**

Improper fractions: 11/4 × 4/3 = 44/12 = 11/3 = 3 2/3.

4. **5.2×10^{-4}**

Move the decimal point 4 places to the right to get 5.2, so the power of 10 is −4.

5. **1.2×10^9**

$3 \times 4 = 12$ and $10^5 \times 10^3 = 10^8$. $12 \times 10^8 = 1.2 \times 10^9$.

6. **1200**

(6 × 40) ÷ 0.2 = 240 ÷ 0.2 = 1200.

7. **£276**

10% = £24 and 5% = £12, so 15% = £36. £240 + £36 = £276.

8. **£80**

£64 is 80% of the original price. 1% = 64 ÷ 80 = £0.80, so 100% = £80.

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Section B · Algebra

9. **4x − 7**

6x − 15 − 2x + 8 = 4x − 7.

10. **6x(2x − 3)**

The highest common factor of $12x^2$ and 18x is 6x. $12x^2 \div 6x = 2x$ and $18x \div 6x = 3$.

11. **x = 6**

Subtract 2x from both sides: 3x − 7 = 11. Add 7: 3x = 18. Divide by 3: x = 6.

12. **x = 11**

Multiply both sides by 3: x + 4 = 15. Subtract 4: x = 11.

13. **$x^2 + 2x - 15$**

$x^2 - 3x + 5x - 15 = x^2 + 2x - 15$.

14. **(x − 3)(x − 4)**

Find two numbers that multiply to 12 and add to −7: −3 and −4.

15. **4n + 3**

The difference is 4, so start with 4n. 4 × 1 = 4, and 7 − 4 = 3, so the nth term is 4n + 3.

16. **r = (A − p)/3**

Subtract p from both sides: A − p = 3r. Divide by 3: r = (A − p)/3.

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Section C · Ratio, geometry, probability and statistics

17. £40, £60 and £80

2 + 3 + 4 = 9 parts. £180 ÷ 9 = £20 per part: 2 × 20, 3 × 20 and 4 × 20.

18. 4

Gradient = change in y ÷ change in x = (15 − 3) ÷ (4 − 1) = 12 ÷ 3 = 4.

19. 120°

Each exterior angle is 360° ÷ 6 = 60°, so each interior angle is 180° − 60° = 120°.

20. 15 cm

$c^2 = 9^2 + 12^2 = 81 + 144 = 225$, so $c = \sqrt{225} = 15$ cm.

21. 45 cm²

Area = ½ × (a + b) × h = ½ × (7 + 11) × 5 = ½ × 18 × 5 = 45 cm².

22. 25π cm²

Area = $\pi r^2 = \pi \times 5^2 = 25\pi$ cm².

23. 0.25

The probabilities add up to 1: 1 − 0.35 − 0.4 = 0.25.

24. 13

The total of all five is 5 × 12 = 60. The four numbers add up to 47, so the fifth is 60 − 47 = 13.