GRADEUP

AQA (GCSE Notes)

Chapter 1: Number

Q1. Arrange the following numbers in ascending order: -3.7, 2 ¾, -2 ½, 3.6, 0.
Answer: -3.7, -2 ½, 0, 2 ¾, 3.6
Explanation: Negative numbers are less than zero, and among negatives, the one with greater absolute value is smaller. Positive numbers follow accordingly.

Q2. Write the numbers ⅞, 0.86, and 7/10 in descending order.
Answer: 0.86, ⅞, 7/10
Explanation: ⅞ ≈ 0.875 and 7/10 = 0.7. Hence, 0.86 < 0.875 < 0.7 is false. Correct order is 0.86, 0.875, 0.7.

Q3. Determine whether -4.5 > -9/2 is true or false using appropriate justification.
Answer: False
Explanation: -4.5 = -9/2, so they are equal, not greater.

Q4. Compare -1.2 and -6/5 using the correct inequality sign.
Answer: -1.2 = -6/5
Explanation: -6/5 = -1.2 exactly.

Q5. Place the following numbers on a number line: -2.4, -1¾, 0, 1.25, 3⅓.
Answer: -2.4, -1¾, 0, 1.25, 3⅓
Explanation: All values are correctly sequenced from least to greatest on a number line.

Q6. Write the following numbers in order from smallest to largest: -0.25, 1/3, -2/5, 0.1.
Answer: -2/5, -0.25, 0.1, 1/3
Explanation: -2/5 ≈ -0.4, so smallest, and others increase in value.

Q7. Identify which number is greater: -7.6 or -7 ½.
Answer: -7 ½
Explanation: -7.5 > -7.6 as it's closer to zero.

Q8. Convert the following mixed numbers to improper fractions and compare them: 3 ⅓ and 10/3.
Answer: 3 ⅓ = 10/3 → 10/3 = 10/3
Explanation: Both are equal when converted to improper fractions.

Q9. Fill in the blank with the correct symbol (=, ≠, <, >, ≤, ≥): -8/3 ___ -2.6
Answer: -8/3 < -2.6
Explanation: -8/3 ≈ -2.666, which is less than -2.6.

Q10. Which is greater: 5.06 or 5.0601? Show how place value supports your answer.
Answer: 5.0601
Explanation: The extra 0.0001 in 5.0601 makes it slightly greater.

Q11. Multiply: -4 × 3.2
Answer: -12.8
Explanation: Negative times positive gives a negative result.

Q12. Divide: -36 ÷ 4.5
Answer: -8
Explanation: 36 ÷ 4.5 = 8; applying the sign gives -8.

Q13. Subtract: -3 ½ – 1 ¼
Answer: -4 ¾
Explanation: Subtracting a positive from a negative moves further left on the number line.

Q14. Add: -2.5 + 3 ¾
Answer: 1.25
Explanation: 3.75 – 2.5 = 1.25

Q15. Simplify the expression: -6 + 4 – 3.2 + 1.7
Answer: -3.5
Explanation: Combine: (-6 + 4) = -2, (-3.2 + 1.7) = -1.5, then -2 + (-1.5) = -3.5

Q16. Evaluate: ⅝ × (–16)
Answer: -10
Explanation: ⅝ of 16 = 10, and applying the sign = -10.

Q17. Calculate the product of -3 ⅓ and 2 ½
Answer: -8⅓
Explanation: Convert to improper: (-10/3) × (5/2) = -50/6 = -25/3 = -8⅓

Q18. Perform the division and give the answer as a mixed number: -7 ÷ 1¼
Answer: -5⅗
Explanation: 1¼ = 5/4, so -7 ÷ 5/4 = -7 × 4/5 = -28/5 = -5⅗

Q19. Add the following: -5 ¾ + (-2 ⅓)
Answer: -8 1/12
Explanation: Convert and add: -23/4 + (-7/3) = (-69 – 28)/12 = -97/12 = -8 1/12

Q20. Multiply the following decimals: -1.5 × 0.06
Answer: -0.09
Explanation: 1.5 × 0.06 = 0.09 → with negative = -0.09

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Q21. Subtract -3.2 from 1.7
Answer: 4.9
Explanation: 1.7 – (-3.2) = 1.7 + 3.2 = 4.9

Q22. Evaluate: (-2 ⅔) + (4 ⅓)
Answer: 1 ⅔
Explanation: Convert and add: -8/3 + 13/3 = 5/3 = 1 ⅔

Q23. Multiply: -⅔ × ¾
Answer: -½
Explanation: -2/3 × 3/4 = -6/12 = -½

Q24. Divide: 4.2 ÷ (-0.3)
Answer: -14
Explanation: 4.2 ÷ 0.3 = 14 → with sign = -14

Q25. Simplify and evaluate: (-2 ½) – (-1 ⅓)
Answer: -1 1/6
Explanation: -5/2 + 4/3 = (-15 + 8)/6 = -7/6 = -1 1/6

Q26. Add together: 0.125 + 1/8 + ⅜
Answer: 0.625
Explanation: 0.125 = 1/8, so 1/8 + 1/8 + 3/8 = 5/8 = 0.625

Q27. Find the difference: 6 – 10.35
Answer: -4.35
Explanation: Subtracting larger from smaller gives negative result.

Q28. Perform: (-12.6) ÷ (–0.9)
Answer: 14
Explanation: Two negatives cancel: 12.6 ÷ 0.9 = 14

Q29. Evaluate the expression: (5.2 – 9.6) + (3.4)
Answer: -1
Explanation: 5.2 – 9.6 = -4.4; -4.4 + 3.4 = -1

Q30. Subtract a negative number: 8.7 – (–1.3)
Answer: 10
Explanation: Double negative becomes addition: 8.7 + 1.3 = 10

Q31. Compare and fill the blank: 0.00045 ___ 0.0045
Answer: <
Explanation: 0.00045 has fewer tenths, hundredths, thousandths than 0.0045

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Q32. Convert and compare: Write 0.6 as a fraction and compare it with ⅝
Answer: 0.6 = 3/5 > ⅝
Explanation: 3/5 = 0.6, ⅝ = 0.625; so 0.6 < 0.625

Q33. Calculate: -2.25 + 3.6 – 5.4
Answer: -4.05
Explanation: -2.25 + 3.6 = 1.35; 1.35 – 5.4 = -4.05

Q34. Use formal written methods to divide 7.84 by 0.4
Answer: 19.6
Explanation: Move decimal: 78.4 ÷ 4 = 19.6

Q35. Use place value to determine the value of the digit 7 in the number 407.062
Answer: 7
Explanation: The 7 is in the units place → value is 7 × 1 = 7

Q36. Multiply -0.02 by 10,000 and explain the shift in place value
Answer: -200
Explanation: Moving decimal 4 places right: -0.02 × 10,000 = -200

Q37. Divide: 0.00072 ÷ 0.00009
Answer: 8
Explanation: Shift decimals → 72 ÷ 9 = 8

Q38. Round 0.008673 to 2 decimal places and explain the reasoning
Answer: 0.01
Explanation: 2nd decimal is 0.00(8), next digit is 6 → round up

Q39. Add: -1.32 + 0.8 + (-3.5)
Answer: -4.02
Explanation: -1.32 – 3.5 = -4.82, then +0.8 = -4.02

Q40. Subtract: -0.625 – 0.25
Answer: -0.875
Explanation: Subtracting a positive deepens the negative

Q41. Evaluate the expression using brackets: (-3.5 + 1.2) × 4
Answer: -9.2
Explanation: Inside = -2.3; × 4 = -9.2

Q42. Multiply the mixed numbers: 1 ⅓ × (-3 ⅔)
Answer: -4 8/9
Explanation: 4/3 × -11/3 = -44/9 = -4 8/9

Q43. Simplify the following: -4/5 × 10
Answer: -8
Explanation: 4/5 × 10 = 8 → apply sign

Q44. Write the decimal 0.00036 in standard form
Answer: 3.6×10^{-4}
Explanation: Decimal moved 4 places to right

Q45. Convert the fraction 11/8 into a decimal and then compare it to 1.4
Answer: 1.375 < 1.4
Explanation: 11 ÷ 8 = 1.375 < 1.4

Q46. Compare and justify using place value: 6.705 ___ 6.750
Answer: <
Explanation: Tenths same, hundredths 0 vs 5 → 6.705 < 6.750

Q47. Multiply: 0.004 × (-0.6)
Answer: -0.0024
Explanation: Product is 0.0024 with negative sign

Q48. Divide a negative by a positive: -81 ÷ 9
Answer: -9
Explanation: 81 ÷ 9 = 9, apply negative

Q49. Use long multiplication to calculate: -12.4 × 3.1
Answer: -38.44
Explanation: 124 × 31 = 3844 → 2 decimals → -38.44

Q50. Write 3.075 in words, and identify the place value of each digit
Answer: Three and seventy-five thousandths. 3 (units), 0 (tenths), 7 (hundredths), 5 (thousandths)
Explanation: Based on decimal position and standard reading format.

Q51. Simplify the expression: $(3^2 + 4) \times (12 \div 3) - 5$
Answer: 25
Explanation: $3^2 = 9$ → (9 + 4) = 13; 12 ÷ 3 = 4; then 13 × 4 = 52; 52 – 5 = 47.

Q52. Given that $72 = 2^3 \times 3^2$, write down the prime factorisation of 144 in index form.
Answer: $2^4 \times 3^2$
Explanation: $144 = 12 \times 12 = (2^2 \times 3)^2 = 2^4 \times 3^2$

Q53. Find the lowest common multiple (LCM) of 18 and 24 using prime factorisation.
Answer: 72
Explanation: $18 = 2 \times 3^2$; $24 = 2^3 \times 3$ → LCM = $2^3 \times 3^2 = 72$

Q54. Two numbers have a highest common factor (HCF) of 6 and a lowest common multiple (LCM) of 120. If one of the numbers is 24, find the other.
Answer: 30
Explanation: HCF × LCM = product of numbers → 6 × 120 = 24 × x → x = 720 ÷ 24 = 30

Q55. Without using a calculator, evaluate the expression: $\sqrt{(4^2 + 3^2)}$
Answer: 5
Explanation: $4^2 = 16$, $3^2 = 9$ → 16 + 9 = 25 → $\sqrt{25} = 5$

Q56. If a × b = 36 and b = 9, use the inverse operation to find the value of a.
Answer: 4
Explanation: a = 36 ÷ 9 = 4

Q57. Expand and simplify: 5(2x – 3) – 3(x – 4)
Answer: 7x + 3
Explanation: 10x – 15 – 3x + 12 = 7x – 3

Q58. Write 210 as a product of its prime factors using index notation.
Answer: 2 × 3 × 5 × 7
Explanation: 210 = 2 × 105 → 2 × 3 × 35 → 2 × 3 × 5 × 7

Q59. A number is divisible by both 12 and 18. What is the smallest possible value of this number?
Answer: 36
Explanation: LCM(12, 18) = $2^2 \times 3^2 = 36$

Q60. Use the unique factorisation theorem to find the HCF of 84 and 126.
Answer: 42
Explanation: $84 = 2^2 \times 3 \times 7$; $126 = 2 \times 3^2 \times 7$ → HCF = 2 × 3 × 7 = 42

Q61. Simplify the expression by cancelling common factors: $(14x^2 – 21x) \div (7x)$
Answer: 2x – 3
Explanation: Factor numerator: 7x(2x – 3); cancel 7x → result = 2x – 3

Q62. Given that x = 5, evaluate the expression: $2x^2 – 4x + 3$
Answer: 33
Explanation: 2(25) – 20 + 3 = 50 – 20 + 3 = 33

Q63. If 3(x + 2) = 2(2x – 1), solve for x.
Answer: 8
Explanation: 3x + 6 = 4x – 2 → -x = -8 → x = 8

Q64. The reciprocal of a number is ⅔. What is the original number?
Answer: 3/2
Explanation: Reciprocal of ⅔ = 3/2

Q65. Simplify the following using the laws of indices: $(2^3 \times 2^4) \div 2^2$
Answer: 2^5
Explanation: $2^3 \times 2^4 = 2^7$; then $\div 2^2 = 2^5$

Q66. Evaluate the expression: $[5 + 3 \times (2^2)] - 6$
Answer: 11
Explanation: $2^2 = 4$; $3 \times 4 = 12$; $5 + 12 = 17$; $17 - 6 = 11$

Q67. Find the value of x in the equation: $x^2 = 121$
Answer: $x = \pm 11$
Explanation: $\sqrt{121} = 11 \rightarrow$ both positive and negative roots valid

Q68. Using product notation, express the prime factorisation of 1000
Answer: $2^3 \times 5^3$
Explanation: $1000 = 10^3 = (2 \times 5)^3 = 2^3 \times 5^3$

Q69. Explain why the square root of a prime number is always irrational
Answer: Because prime numbers cannot be expressed as the square of a rational number, their square roots are non-terminating, non-repeating decimals.

Q70. The HCF of two numbers is 15 and their LCM is 180. If one number is 45, determine the other using the relationship between HCF, LCM and product of two numbers.
Answer: 60
Explanation: HCF × LCM = product $\rightarrow$ $15 \times 180 = 2700 = 45 \times x \rightarrow x = 60$

Q71. List all the different two-digit numbers that can be made using the digits 3, 5, and 7, without repeating digits
Answer: 35, 37, 53, 57, 73, 75
Solution: Choose 2 different digits from 3, 5, and 7. Total = $3 \times 2 = 6$ combinations.

Q72. How many different ways can you arrange the letters in the word "CUBE"?
Answer: 24
Solution: 4 distinct letters $\rightarrow 4! = 4 \times 3 \times 2 \times 1 = 24$

Q73. Simplify: $2^4 \times 2^3$
Answer: $2^7 = 128$
Solution: When bases are the same, add powers: $2^4 \times 2^3 = 2^{(4+3)} = 2^7$

Q74. Simplify: $(3^2)^3$
Answer: 729
Solution: $(3^2)^3 = 3^{(2\times3)} = 3^6 = 729$

Q75. Write down the value of 5^0
Answer: 1
Solution: Any non-zero number raised to the power 0 equals 1

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Q76. Calculate the exact value of 64^(1/3)
Answer: 4
Solution: Cube root of 64 is 4 because $4^3 = 64$

Q77. Without using a calculator, work out the value of 4^(3/2)
Answer: 8
Solution: $4^{(3/2)} = (\sqrt{4})^3 = 2^3 = 8$

Q78. Simplify: $(\sqrt{5})^2$
Answer: 5
Solution: Square of a square root gives the number: $(\sqrt{5})^2 = 5$

Q79. Simplify: $3\sqrt{2} + 2\sqrt{2}$
Answer: $5\sqrt{2}$
Solution: Add like terms: $3\sqrt{2} + 2\sqrt{2} = (3+2)\sqrt{2} = 5\sqrt{2}$

Q80. Simplify: $\sqrt{50}$
Answer: $5\sqrt{2}$
Solution: $\sqrt{50} = \sqrt{(25\times2)} = \sqrt{25} \times \sqrt{2} = 5\sqrt{2}$

Q81. Write $\sqrt{12}$ in its simplest surd form
Answer: $2\sqrt{3}$
Solution: $\sqrt{12} = \sqrt{(4\times3)} = \sqrt{4} \times \sqrt{3} = 2\sqrt{3}$

Q82. Rationalise the denominator: $3 / \sqrt{2}$
Answer: $(3\sqrt{2}) / 2$
Solution: Multiply numerator and denominator by $\sqrt{2}$: $(3 / \sqrt{2}) \times (\sqrt{2} / \sqrt{2}) = 3\sqrt{2} / 2$

Q83. Rationalise and simplify: $4 / \sqrt{5}$
Answer: $(4\sqrt{5}) / 5$
Solution: Multiply by $\sqrt{5}$: $(4 / \sqrt{5}) \times (\sqrt{5} / \sqrt{5}) = 4\sqrt{5} / 5$

Q84. Simplify: $(\sqrt{3})^2 + \sqrt{9}$
Answer: 3 + 3 = 6
Solution: $(\sqrt{3})^2 = 3$ and $\sqrt{9} = 3 \rightarrow 3 + 3 = 6$

Q85. Expand and simplify: $(\sqrt{2} + \sqrt{3})^2$
Answer: $5 + 2\sqrt{6}$
Solution: Use $(a + b)^2 = a^2 + 2ab + b^2 \rightarrow (\sqrt{2})^2 + 2\sqrt{2}\sqrt{3} + (\sqrt{3})^2 = 2 + 2\sqrt{6} + 3 = 5 + 2\sqrt{6}$

Q86. Simplify the expression: $(2\sqrt{3})(5\sqrt{6})$
Answer: $10\sqrt{18} = 30\sqrt{2}$
Solution: Multiply constants and roots: $2\times5 = 10$, $\sqrt{3}\times\sqrt{6} = \sqrt{18} = 3\sqrt{2} \rightarrow 10\times3\sqrt{2} = 30\sqrt{2}$

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Q87. Simplify: $\sqrt{a} \times \sqrt{b}$
Answer: $\sqrt{(ab)}$
Solution: Product of square roots = square root of the product

Q88. Simplify and give your answer in terms of surds: $\sqrt{(27 \times 12)}$
Answer: 18
Solution: $27 \times 12 = 324 \rightarrow \sqrt{324} = 18$

Q89. Write 8^(2/3) as a surd
Answer: $(\sqrt[3]{8})^2 = 2^2 = 4$
Solution: $8^{(2/3)} = (8^{(1/3)})^2 = 2^2 = 4$

Q90. Simplify: (16)^(3/4)
Answer: 8
Solution: $16^{(3/4)} = (\sqrt{\sqrt{16}})^3 = (2)^3 = 8$

Q91. Evaluate: (81)^(1/4)
Answer: 3
Solution: Fourth root of 81 = 3, because $3^4 = 81$

Q92. Simplify: $(x^3)^{(1/2)}$
Answer: $x^{(3/2)}$
Solution: Multiply powers: $(x^3)^{(1/2)} = x^{(3 \times 1/2)} = x^{(3/2)}$

Q93. Work out the exact value of $\pi \times 6^2$
Answer: 36π
Solution: $6^2 = 36$, so $\pi \times 36 = 36\pi$

Q94. Give an exact value for the area of a circle with radius 3 cm, in terms of π
Answer: 9π cm²
Solution: Area = $\pi r^2 = \pi \times 3^2 = \pi \times 9 = 9\pi$

Q95. Calculate exactly: $(2/3)^2$
Answer: 4/9
Solution: $(2/3)^2 = 4/9$

Q96. Simplify: $(x^2 \times x^3) / x^4$
Answer: x
Solution: $x^2 \times x^3 = x^5 \rightarrow x^5 / x^4 = x$

Q97. Simplify fully: $5\sqrt{18} - \sqrt{50}$
Answer: $15\sqrt{2} - 5\sqrt{2} = 10\sqrt{2}$
Solution: $\sqrt{18} = 3\sqrt{2}$, $\sqrt{50} = 5\sqrt{2} \rightarrow 5 \times 3\sqrt{2} - 5\sqrt{2} = 15\sqrt{2} - 5\sqrt{2} = 10\sqrt{2}$

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Q98. Expand and simplify: (√3 + 1)(√3 – 1)
Answer: 2
Solution: Use (a + b)(a – b) = a² – b² → (√3)² – 1² = 3 – 1 = 2

Q99. Simplify: (x^(1/2))²
Answer: x
Solution: Multiply powers: x^(1/2 × 2) = x¹ = x

Q100. Express 125^(2/3) as a whole number
Answer: 25
Solution: 125^(2/3) = (∛125)² = 5² = 25

Q101. Simplify: √(a²)
Answer: |a|
Solution: √(a²) = |a| (absolute value of a)

Q102. Simplify: (a^(1/2) × a^(1/3))
Answer: a^(5/6)
Solution: Add powers: a^(1/2 + 1/3) = a^(3/6 + 2/6) = a^(5/6)

Q103. Expand and simplify: (2 + √5)(2 – √5)
Answer: -1
Solution: Use difference of squares: 2² – (√5)² = 4 – 5 = -1

Q104. Work out the cube root of 0.008
Answer: 0.2
Solution: 0.2³ = 0.008 → ∛0.008 = 0.2

Q105. Simplify: 1 / √8
Answer: √8 / 8
Solution: Multiply by √8: (1 / √8) × (√8 / √8) = √8 / 8

Q106. Rationalise the denominator and simplify: 5 / (2√3)
Answer: (5√3) / 6
Solution: Multiply by √3: (5 / 2√3) × (√3 / √3) = 5√3 / (2×3) = 5√3 / 6

Q107. Simplify: (9x²)^(1/2)
Answer: 3x
Solution: √(9x²) = √9 × √x² = 3x

Q108. Evaluate: (x^(3/2)) / (x^(1/2))
Answer: x
Solution: Subtract powers: x^(3/2 – 1/2) = x¹ = x

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Q109. Write the number 64 as a power of 4
Answer: 4^3
Solution: $4^3 = 64$

Q110. Simplify: $(\sqrt{27} + \sqrt{3})^2$
Answer: $30 + 6\sqrt{3}$
Solution: $\sqrt{27} = 3\sqrt{3} \rightarrow (3\sqrt{3} + \sqrt{3})^2 = (4\sqrt{3})^2 = 16 \times 3 = 48$ (Correction: Let's expand properly:)
Use $(a + b)^2 = a^2 + 2ab + b^2$
$\rightarrow (\sqrt{27} + \sqrt{3})^2 = 27 + 2\sqrt{81} + 3 = 27 + 18 + 3 =$ **48**

Q111. Simplify: $\sqrt{(3^2 + 4^2)}$
Answer: 5
Solution: $3^2 + 4^2 = 9 + 16 = 25 \rightarrow \sqrt{25} = 5$

Q112. Calculate exactly: $\pi \times 12$
Answer: 12π
Solution: Just multiply: $\pi \times 12 = 12\pi$

Q113. Simplify: (x^(2/3))³
Answer: x^2
Solution: Multiply powers: x^(2/3 × 3) = x^2

Q114. Simplify: (x^(1/4))²
Answer: x^(1/2)
Solution: Multiply powers: x^(1/4 × 2) = x^(1/2)

Q115. Express 32 as a power of 2
Answer: 2^5
Solution: $2^5 = 32$

Q116. Write down all the square numbers less than 100
Answer: 1, 4, 9, 16, 25, 36, 49, 64, 81
Solution: Squares of numbers 1^2 to 9^2

Q117. Simplify: $\sqrt{48} + \sqrt{75}$
Answer: $4\sqrt{3} + 5\sqrt{3} = 9\sqrt{3}$
Solution: $\sqrt{48} = 4\sqrt{3}$, $\sqrt{75} = 5\sqrt{3} \rightarrow$ Add: $9\sqrt{3}$

Q118. Rationalise the denominator and simplify: $(6 + \sqrt{2}) / \sqrt{2}$
Answer: $(6\sqrt{2} + 2) / 2$
Solution: Multiply numerator and denominator by $\sqrt{2}$:
$(6 + \sqrt{2})/\sqrt{2} \times (\sqrt{2}/\sqrt{2}) = (6\sqrt{2} + 2)/2$

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Q119. Simplify: $\sqrt{(2a)} \times \sqrt{(8a)}$
Answer: $\sqrt{(16a^2)} = 4a$
Solution: Multiply inside roots: $\sqrt{(2a \times 8a)} = \sqrt{(16a^2)} = 4a$

Q120. Expand and simplify: $(x + \sqrt{2})(x - \sqrt{2})$
Answer: $x^2 - 2$
Solution: Use $(a + b)(a - b) = a^2 - b^2 \rightarrow x^2 - (\sqrt{2})^2 = x^2 - 2$

Q121. Express 3,600,000 in standard form
Answer: 3.6×10^6
Solution: Move the decimal point 6 places to the left to get a number between 1 and 10: 3.6×10^6

Q122. Write 7.25×10^{-3} as an ordinary number
Answer: 0.00725
Solution: Move the decimal point 3 places to the left: 7.25 → 0.00725

Q123. A car travels 3.2×10^5 metres in 4×10^2 seconds. Work out the average speed in standard form
Answer: 8×10^2 m/s
Solution: $(3.2 \times 10^5) \div (4 \times 10^2) = (3.2 \div 4) \times 10^{(5-2)} = 0.8 \times 10^3 = 8 \times 10^2$

Q124. Multiply (6.4×10^4) by (5×10^3) and give your answer in standard form
Answer: 3.2×10^8
Solution: $(6.4 \times 5) \times 10^{(4+3)} = 32 \times 10^7 = 3.2 \times 10^8$

Q125. Divide (8.1×10^6) by (3×10^2) and write the answer in standard form
Answer: 2.7×10^4
Solution: $(8.1 \div 3) \times 10^{(6-2)} = 2.7 \times 10^4$

Q126. A bacteria population doubles every hour. Initially, there are 4.5×10^3 bacteria. How many will there be after 3 hours?
Answer: 3.6×10^4
Solution: Double 3 times: $4.5 \times 2^3 = 4.5 \times 8 = 36 \times 10^3 = 3.6 \times 10^4$

Q127. Convert 0.875 into a fraction in its simplest form
Answer: 7/8
Solution: 0.875 = 875/1000 = 7/8 after simplification

Q128. Write 11/4 as a decimal
Answer: 2.75
Solution: 11 ÷ 4 = 2.75

Q129. A drink contains 0.6 litres of water. Express this as a fraction of a litre
Answer: 3/5
Solution: 0.6 = 6/10 = 3/5

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Q130. Convert the recurring decimal 0.333... into a fraction
Answer: 1/3
Solution: Let x = 0.333..., then 10x = 3.333..., subtract to get 9x = 3 → x = 1/3

Q131. A chocolate bar weighs 0.375 kg. Express this weight as a fraction in its simplest form
Answer: 3/8
Solution: 0.375 = 375/1000 = 3/8

Q132. Write 2 3/8 as a decimal
Answer: 2.375
Solution: 3/8 = 0.375 → 2 + 0.375 = 2.375

Q133. A packet contains 0.25 kg of nuts. If each serving is 1/8 kg, how many servings are there?
Answer: 2
Solution: 0.25 = 1/4 → (1/4) ÷ (1/8) = 2

Q134. Convert the decimal 1.2 into a mixed number
Answer: 1 1/5
Solution: 0.2 = 1/5 → 1.2 = 1 1/5

Q135. Express 5/6 as a decimal, giving your answer to 3 decimal places
Answer: 0.833
Solution: 5 ÷ 6 = 0.833...

Q136. Divide £2.40 between Alice and Ben in the ratio 3:5. How much does each receive?
Answer: Alice = £0.90, Ben = £1.50
Solution: 3+5=8 parts. £2.40 ÷ 8 = £0.30 per part → Alice: 3×0.30=£0.90, Ben: 5×0.30=£1.50

Q137. Simplify the ratio 6/10 : 9/15
Answer: 1:1
Solution: 6/10 = 3/5, 9/15 = 3/5 → ratio = 3/5 : 3/5 = 1:1

Q138. Divide 42 grams of gold into the ratio 1/3 : 2/3
Answer: 14 g : 28 g
Solution: Total = 1/3 + 2/3 = 1. Divide 42 × (1/3) = 14, and 42 × (2/3) = 28

Q139. A recipe uses 3/4 of a cup of sugar to 1/2 a cup of oil. Write this as a ratio in its simplest form
Answer: 3:2
Solution: (3/4):(1/2) = (3/4) ÷ (1/2) = 3/4 × 2/1 = 6/4 = 3:2

Q140. Divide 500ml of a drink in the ratio 2/5 : 3/5
Answer: 200ml : 300ml
Solution: 2/5 × 500 = 200, 3/5 × 500 = 300

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Q141. There are 36 students in a class. The ratio of boys to girls is 5/9 : 4/9. How many boys are there?
Answer: 20
Solution: 5/9 + 4/9 = 1 → boys = 5/9 × 36 = 20

Q142. A map uses the ratio 1:50,000. What is the actual distance (in km) represented by 3.2 cm on the map?
Answer: 1.6 km
Solution: 3.2 × 50,000 = 160,000 cm = 1.6 km

Q143. Increase 120 by 15%
Answer: 138
Solution: 15% of 120 = 18 → 120 + 18 = 138

Q144. Decrease £180 by 20%
Answer: £144
Solution: 20% of 180 = 36 → 180 – 36 = 144

Q145. A coat is reduced in a sale by 30%. If the sale price is £84, what was the original price?
Answer: £120
Solution: Let original = x → 70% of x = 84 → 0.7x = 84 → x = 120

Q146. A bank pays 2% interest annually. How much interest is earned on £450 over one year?
Answer: £9
Solution: 2% of £450 = (2/100) × 450 = £9

Q147. 25% of a number is 60. What is the number?
Answer: 240
Solution: Let x be the number → 0.25x = 60 → x = 240

Q148. 80 is what percentage of 320?
Answer: 25%
Solution: (80 ÷ 320) × 100 = 25%

Q149. Express 48 as a percentage of 80
Answer: 60%
Solution: (48 ÷ 80) × 100 = 60%

Q150. A factory increases its production by 12% each year. If it produced 5,000 units this year, how many will it produce next year?
Answer: 5,600
Solution: 12% of 5000 = 600 → 5000 + 600 = 5600

GRADEUP

Q151. A worker earns £9.60 per hour. How much does she earn in 37.5 hours?
Answer: £360
Solution: 9.60 × 37.5 = £360

Q152. A bag of flour weighs 2.5 kg. How many 0.2 kg loaves can be made from it?
Answer: 12
Solution: 2.5 ÷ 0.2 = 12.5 → 12 full loaves

Q153. Convert 1.75 metres into centimetres
Answer: 175 cm
Solution: 1 m = 100 cm → 1.75 × 100 = 175

Q154. A journey takes 2.5 hours. Express this time in minutes
Answer: 150 minutes
Solution: 2.5 × 60 = 150

Q155. Convert 0.85 litres into millilitres
Answer: 850 ml
Solution: 1 litre = 1000 ml → 0.85 × 1000 = 850

Q156. A container holds 2.4 litres of water. How many 300 ml cups can be filled?
Answer: 8
Solution: 2.4 L = 2400 ml → 2400 ÷ 300 = 8

Q157. A car travels 180 km in 2.5 hours. Calculate its average speed in km/h
Answer: 72 km/h
Solution: 180 ÷ 2.5 = 72

Q158. A sprinter runs 100 metres in 9.58 seconds. Calculate their average speed in m/s
Answer: 10.44 m/s
Solution: 100 ÷ 9.58 ≈ 10.44

Q159. A rectangle has length 2.4 m and width 1.5 m. Find its area in m²
Answer: 3.6 m²
Solution: 2.4 × 1.5 = 3.6

Q160. A water tank has a volume of 1.2 m³. Convert this volume to litres
Answer: 1200 litres
Solution: 1 m³ = 1000 litres → 1.2 × 1000 = 1200

Q161. A cyclist covers 36 km in 1.5 hours. What is their speed in m/s?
Answer: 6.67 m/s
Solution: 36 km = 36,000 m; 1.5 hrs = 5400 s → 36000 ÷ 5400 ≈ 6.67

GRADEUP

Q162. A van travels 225 miles in 3.75 hours. Find its average speed in mph
Answer: 60 mph
Solution: 225 ÷ 3.75 = 60

Q163. Convert 5 minutes 30 seconds into seconds
Answer: 330 seconds
Solution: (5 × 60) + 30 = 300 + 30 = 330

Q164. A recipe needs 0.75 kg of flour. You only have 375 g. What fraction of the required flour do you have?
Answer: 1/2
Solution: 0.75 kg = 750 g → 375 ÷ 750 = 1/2

Q165. A road is 2.8 miles long. Convert this length into kilometres (1 mile = 1.609 km)
Answer: 4.5052 km
Solution: 2.8 × 1.609 ≈ 4.5052

Q166. A tank fills at a rate of 1.5 litres per second. How much water will it contain after 4 minutes?
Answer: 360 litres
Solution: 4 minutes = 240 seconds → 1.5 × 240 = 360

Q167. A car uses 45 litres of fuel to travel 540 km. Calculate its fuel efficiency in km/litre
Answer: 12 km/litre
Solution: 540 ÷ 45 = 12

Q168. A rectangular field is 0.5 km long and 300 m wide. Find the area in m²
Answer: 150,000 m²
Solution: 0.5 km = 500 m → 500 × 300 = 150,000

Q169. Convert 0.0045 m to millimetres
Answer: 4.5 mm
Solution: 0.0045 m = 0.0045 × 1000 = 4.5 mm

Q170. A person earns £2,500 per month. Calculate their annual income
Answer: £30,000
Solution: 2500 × 12 = 30,000

Q171. Estimate the value of 49.3 × 0.81 by rounding each number to 1 significant figure
Answer: 50 × 0.8 = 40
Solution: 49.3 ≈ 50, 0.81 ≈ 0.8 → 50 × 0.8 = 40

Q172. Without using a calculator, estimate the value of √82 by comparing it with two nearby square numbers

Answer: Between 9 and 10
Solution: 81 = 9^2 and 100 = 10^2, so $\sqrt{82}$ is slightly more than 9

Q173. Round 0.04856 to 2 significant figures
Answer: 0.049
Solution: First two significant figures are 4 and 8, next digit is 5 → round up

Q174. Round 6.295 to 2 decimal places
Answer: 6.30
Solution: 3rd decimal is 5 → round the second decimal place up

Q175. Round 13,475 to the nearest hundred
Answer: 13,500
Solution: Tens digit is 7 → round up

Q176. A length is measured as 7.56 cm to the nearest 0.01 cm. Write the error interval for the actual length
Answer: 7.555 cm ≤ length < 7.565 cm
Solution: ±0.005 from 7.56 gives interval from 7.555 to just under 7.565

Q177. A car's mass is recorded as 1,350 kg to the nearest 10 kg. State the lower and upper bounds for the mass
Answer: 1,345 kg ≤ mass < 1,355 kg
Solution: ±5 kg gives lower and upper bounds

Q178. The width of a table is given as 85.3 cm, measured to the nearest 0.1 cm. Write this measurement as an error interval using inequality notation
Answer: 85.25 cm ≤ width < 85.35 cm
Solution: ±0.05 from 85.3 gives the range

Q179. A time is recorded as 3.6 s to 1 decimal place. State the upper bound for the time
Answer: 3.65 s
Solution: Add 0.05 to 3.6 to get upper bound

Q180. A temperature is recorded as -2.4°C to the nearest tenth of a degree. Write the error interval using inequality notation
Answer: -2.45°C ≤ temperature < -2.35°C
Solution: ±0.05 from -2.4 gives the bounds

Q181. A student calculates 23.9 × 1.06 = 25.334. Use estimation to check if this result is reasonable
Answer: Yes, it is reasonable
Solution: Estimate: 24 × 1 = 24 → 25.334 is close

Q182. A value is given as 2.938 to 3 decimal places. Round this to 2 significant figures
Answer: 2.9
Solution: First two significant digits are 2 and 9 → next digit is 3, so no rounding up

Q183. Round the number 0.000849 to 2 significant figures
Answer: 0.00085
Solution: First two significant digits are 8 and 4, third is 9 → round up

Q184. A measurement is given as 12.08 cm. State the upper and lower bounds if it was rounded to the nearest 0.01 cm
Answer: 12.075 cm ≤ length < 12.085 cm
Solution: ±0.005 from 12.08

Q185. A mobile phone weighs 173 g to the nearest gram. Write the error interval for the weight
Answer: 172.5 g ≤ weight < 173.5 g
Solution: ±0.5 g around 173 g

Q186. A distance is measured as 2.7 km to 1 decimal place. Use inequality notation to write the error interval
Answer: 2.65 km ≤ distance < 2.75 km
Solution: ±0.05 km around 2.7

Q187. A box contains approximately 496 nails. Estimate how many nails would be in 25 such boxes
Answer: About 12,500
Solution: Estimate 496 ≈ 500 → 500 × 25 = 12,500

Q188. Use rounding to estimate the result of (23.7 × 4.9) ÷ 11.2
Answer: ≈10
Solution: Round to 24 × 5 = 120 → 120 ÷ 12 = 10

Q189. A machine cuts steel rods to a length of 52.3 cm. The actual lengths can vary by up to 0.2 cm. Write the range of possible lengths using inequality notation
Answer: 52.1 cm ≤ length ≤ 52.5 cm
Solution: ±0.2 cm gives full inclusive range

Q190. A student used a calculator to work out √(103 × 4.2). Check whether the answer 20.8 is reasonable by estimation
Answer: Yes
Solution: Estimate: 100 × 4 = 400 → √400 = 20 → 20.8 is close

Q191. Estimate the value of 38.6 ÷ 1.93 by rounding both numbers appropriately
Answer: ≈40 ÷ 2 = 20
Solution: Estimate values and divide

GRADEUP

Q192. The capacity of a tank is recorded as 245 litres, rounded to the nearest 5 litres. Determine the lower and upper bounds for the capacity
Answer: 242.5 L ≤ capacity < 247.5 L
Solution: ±2.5 around 245

Q193. Round 0.006728 to 3 significant figures
Answer: 0.00673
Solution: Digits: 6, 7, 2; next is 8 → round up

Q194. A measurement is recorded as 4.35 m to 2 decimal places. Use inequality notation to state the range within which the actual value lies
Answer: 4.345 m ≤ value < 4.355 m
Solution: ±0.005 from 4.35

Q195. A pencil is said to be 17.4 cm long to the nearest millimetre. Write the error interval
Answer: 17.35 cm ≤ length < 17.45 cm
Solution: ±0.05 cm

Q196. A school recorded attendance as 94.6% to 1 decimal place. Give the error interval using inequalities
Answer: 94.55% ≤ attendance < 94.65%
Solution: ±0.05% from 94.6%

Q197. A phone battery capacity is listed as 3000 mAh, rounded to the nearest 100 mAh. What are the upper and lower bounds?
Answer: 2950 mAh ≤ capacity < 3050 mAh
Solution: ±50 mAh from 3000

Q198. Use estimation to check the result of (0.84 × 19.6) + (3.92 ÷ 0.19)
Answer: ≈97
Solution: Estimate: 0.8 × 20 = 16, 4 ÷ 0.2 = 20 → 16 + 20 = 36

Q199. Round 8.6297 to 3 significant figures
Answer: 8.63
Solution: First three digits are 8, 6, 2 → next is 9 → round up

Q200. Round 563.48 to 1 significant figure
Answer: 600
Solution: First digit 5 → next is 6 → round up

Q201. A board is measured as 1.25 m wide. If it was rounded to the nearest 0.01 m, give its possible range using an inequality
Answer: 1.245 m ≤ width < 1.255 m
Solution: ±0.005 m from 1.25

GRADEUP

Q202. The area of a square is calculated as 25.6 cm², based on a rounded side length. Estimate the side length and check if the area is plausible
Answer: ≈5.1 cm
Solution: √25.6 ≈ 5.06 → makes sense

Q203. A child's height is measured as 1.32 m to 2 decimal places. Write the upper and lower bounds using inequality notation
Answer: 1.315 m ≤ height < 1.325 m
Solution: ±0.005 m

Q204. A builder needs 15 planks, each 2.05 m long. Estimate the total length of wood required
Answer: ≈30 m
Solution: 2.05 ≈ 2 → 15 × 2 = 30

Q205. A laptop weighs 2.78 kg to 2 decimal places. Give the range of values it could actually weigh using inequalities
Answer: 2.775 kg ≤ weight < 2.785 kg
Solution: ±0.005 kg from 2.78

Q206. A number is measured as 0.0048 to 2 significant figures. Write the number rounded to 1 significant figure
Answer: 0.005
Solution: First sig fig is 4, next is 8 → round up

Q207. A recipe needs 0.62 litres of milk, measured to 2 decimal places. Write the error interval using inequalities
Answer: 0.615 L ≤ volume < 0.625 L
Solution: ±0.005 L

Q208. Estimate the answer to 48.1 × 1.94 by rounding to 1 significant figure
Answer: ≈50 × 2 = 100
Solution: Simple rounding and multiplication

Q209. A square has a side length of 7.4 cm, measured to the nearest millimetre. Find the lower and upper bounds for the area
Answer: $7.35^2 = 54.0225$ cm², $7.45^2 = 55.5025$ cm²
Solution: Square the lower and upper bounds of the side length

Q210. A cuboid's dimensions are 12.3 cm, 4.5 cm, and 6.8 cm, all measured to the nearest 0.1 cm. Find the upper bound of the volume
Answer: 12.35 × 4.55 × 6.85 ≈ 384.6 cm³
Solution: Use upper bounds for all dimensions

GRADEUP

Q211. A student writes 3.4591 to 4 significant figures. What is the rounded number?
Answer: 3.459
Solution: 5 is 4th sig fig, next is 1 → no change

Q212. Round the number 0.0003784 to 2 significant figures
Answer: 0.00038
Solution: 3 and 7 are sig figs, 8 rounds 7 up

Q213. A measurement is recorded as 42.0 m, rounded to the nearest metre. State the range of values it could represent using inequalities
Answer: 41.5 m ≤ value < 42.5 m
Solution: ±0.5 from 42.0

Q214. A time is recorded as 2 minutes 15 seconds. Estimate how many such times would occur in an hour
Answer: ≈26
Solution: 2 min 15 sec = 135 sec → 3600 ÷ 135 ≈ 26.7

Q215. A calculation gives 48.916 → round this to 3 decimal places
Answer: 48.916
Solution: Already 3 decimal places

Q216. A runner completes a lap in 53.78 seconds, rounded to the nearest hundredth. State the error interval using inequalities
Answer: 53.775 s ≤ time < 53.785 s
Solution: ±0.005 s

Q217. Round 49,672 to 2 significant figures
Answer: 50,000
Solution: First two digits 4 and 9 → round up to 50,000

Q218. Estimate the value of (1.96 × 17.3) ÷ 8.3 using 1 significant figure rounding
Answer: ≈2 × 20 ÷ 8 = 40 ÷ 8 = 5
Solution: Simple rounding and division

Q219. The temperature was recorded as -1.8°C to the nearest 0.1°C. Write the error interval using inequalities
Answer: -1.85°C ≤ temp < -1.75°C
Solution: ±0.05°C

Q220. A length is measured as 1.63 m to 2 decimal places. State the lower and upper bounds for the measurement
Answer: 1.625 m ≤ length < 1.635 m
Solution: ±0.005 m

Q221. Multiply 234 by 67 using a formal written method.
Answer: 15,678
Solution:
234 × 67
= 234 × (60 + 7)
= 234 × 60 + 234 × 7
= 14,040 + 1,638
= 15,678

Q222. Divide 7325 by 25 using long division.
Answer: 293
Solution:
25 into 73 goes 2 times (25×2=50), remainder 23
Bring down 2 → 232
25 into 232 goes 9 times (25×9=225), remainder 7
Bring down 5 → 75
25 into 75 goes 3 times
Answer: 293

Q223. Add the fractions 5/8 and 3/4, giving your answer in its simplest form.
Answer: 11/8 or 1 3/8
Solution:
Convert 3/4 to 6/8
5/8 + 6/8 = 11/8
Improper to mixed: 1 3/8

Q224. Subtract 7/10 from 11/15 and simplify the result.
Answer: 1/30
Solution:
LCM of 10 and 15 = 30
11/15 = 22/30
7/10 = 21/30
22/30 − 21/30 = 1/30

Q225. Multiply 3/7 by 2/9 and express your answer in the lowest terms.
Answer: 2/21
Solution:
3/7 × 2/9 = (3×2)/(7×9) = 6/63
Simplify: 6/63 = 2/21

Q226. Divide 5/6 by 3/8 and simplify your answer.
Answer: 20/9 or 2 2/9
Solution:

5/6 ÷ 3/8 = 5/6 × 8/3 = (5×8)/(6×3) = 40/18
Simplify: 20/9 = 2 2/9

Q227. Express 81^(1/4) as a simplified number.
Answer: 3
Solution:
81 = 3^4
(3^4)^(1/4) = 3^(4×1/4) = 3^1 = 3

Q228. Simplify (16)^(3/4)
Answer: 8
Solution:
16 = 2^4
(2^4)^(3/4) = 2^(4×3/4) = 2^3 = 8

Q229. Write 125^(-2/3) as a fraction in its simplest form.
Answer: 1/25
Solution:
125 = 5^3
(5^3)^(-2/3) = 5^(-2) = 1/25

Q230. Simplify the expression: (x^1/2) * (x^3/2)
Answer: x^2
Solution:
Add powers: 1/2 + 3/2 = 4/2 = 2
x^2

Q231. State all the factors of 84.
Answer: 1, 2, 3, 4, 6, 7, 12, 14, 21, 28, 42, 84
Solution:
Find all pairs that multiply to 84

Q232. Find the HCF and LCM of 60 and 96.
Answer: HCF = 12, LCM = 480
Solution:
Prime factors:
60 = 2^2 × 3 × 5
96 = 2^5 × 3
HCF = 2^2 × 3 = 12
LCM = 2^5 × 3 × 5 = 480

Q233. Determine whether 347 is a prime number, and explain your reasoning.
Answer: Yes
Solution:

347 is not divisible by any prime ≤ √347 (~18.6), i.e., not divisible by 2, 3, 5, 7, 11, 13, 17
Hence, 347 is prime

Q234. Write the number 0.333... as a fraction in its simplest form.
Answer: 1/3
Solution:
Let x = 0.333…
10x = 3.333…
10x − x = 9x = 3
x = 1/3

Q235. Which is larger: 3/7 or 4/9? Show your working.
Answer: 4/9
Solution:
LCM of 7 and 9 = 63
3/7 = 27/63
4/9 = 28/63
Since 28 > 27, 4/9 is larger

Q236. Place the numbers -2.5, 0, 1/3, and -1/2 in ascending order.
Answer: -2.5, -1/2, 0, 1/3
Solution:
Convert to decimals: -2.5, -0.5, 0, 0.33

Q237. Insert the correct symbol (>, <, =) between the following: 7/10 ___ 0.68
Answer: 7/10 > 0.68
Solution:
7/10 = 0.7
0.7 > 0.68

Q238. Write down a number that satisfies the inequality: -3 < x ≤ 2
Answer: 0
Solution:
0 lies between -3 and 2, inclusive of 2

Q239. Write 4.507 in words and describe the place value of each digit.
Answer: Four and five hundred seven thousandths
Solution:
4 = units
5 = tenths
0 = hundredths
7 = thousandths

Q240. Round 28,573 to the nearest hundred.
Answer: 28,600

Solution:
Check tens digit: 7 → round up
28,573 → 28,600

Q241. Identify the value of the digit 7 in the number 570,241.
Answer: 70,000
Solution:
7 is in the ten-thousands place

Q242. Simplify: (2^3) × (2^4)
Answer: 2^7 = 128
Solution:
Add indices: 3 + 4 = 7
2^7 = 128

Q243. Evaluate: (3^2)^3
Answer: 729
Solution:
3^2 = 9
9^3 = 729

Q244. Simplify the expression: (5^4) ÷ (5^2)
Answer: 5^2 = 25
Solution:
Subtract indices: 4 − 2 = 2
5^2 = 25

Q245. Calculate: (2 × 3)^2
Answer: 36
Solution:
2×3 = 6
6^2 = 36

Q246. How many possible outcomes are there when flipping 3 coins?
Answer: 8
Solution:
Each coin has 2 outcomes: H or T
2 × 2 × 2 = 8

Q247. In how many ways can the letters in the word “MATH” be arranged?
Answer: 24
Solution:
4! = 4 × 3 × 2 × 1 = 24

Q248. A password consists of 3 letters followed by 2 digits. How many different passwords are possible?
Answer: 17,576,000
Solution:
26 letters → 26^3 = 17,576
10 digits → 10^2 = 100
Total = 17,576 × 100 = 1,757,600

Q249. List all the possible outcomes when rolling a six-sided die and flipping a coin.
Answer: H1, H2, H3, H4, H5, H6, T1, T2, T3, T4, T5, T6
Solution:
6 die outcomes × 2 coin outcomes = 12 combinations

Q250. Write down all the integer values that satisfy: -4 ≤ x < 3
Answer: -4, -3, -2, -1, 0, 1, 2
Solution:
List integers from -4 to 2

Q251. Simplify: 3 + 4 × 2
Answer: 11
Solution:
4 × 2 = 8
3 + 8 = 11

Q252. Simplify: (5 + 3)^2 ÷ 4
Answer: 16
Solution:
5 + 3 = 8
8^2 = 64
64 ÷ 4 = 16

Q253. Rewrite the expression 6 − 2 × (3 + 1) using BIDMAS.
Answer: -2
Solution:
3 + 1 = 4
2 × 4 = 8
6 − 8 = -2

Q254. Calculate: (7^2 − 5) ÷ (2 + 1)
Answer: 14
Solution:
7^2 = 49
49 − 5 = 44

2 + 1 = 3
44 ÷ 3 ≈ 14.67 or 14 remainder 2

Q255. Evaluate the expression: 2^4 + 3 × (6 − 4)
Answer: 20
Solution:
2^4 = 16
6 − 4 = 2
3 × 2 = 6
16 + 6 = 22

Q256. Express √49 as an integer.
Answer: 7
Solution:
√49 = 7

Q257. Evaluate ∛64
Answer: 4
Solution:
4^3 = 64 → ∛64 = 4

Q258. Simplify: √(36) + √(81)
Answer: 15
Solution:
√36 = 6
√81 = 9
6 + 9 = 15

Q259. Simplify: 5^2 + 2^3
Answer: 33
Solution:
5^2 = 25
2^3 = 8
25 + 8 = 33

Q260. Calculate 2^5 × 4^2 using index laws.
Answer: 256
Solution:
2^5 = 32
4^2 = 16
32 × 16 = 512

Q261. Convert 3.6 × 10^4 into an ordinary number.
Answer: 36,000

Solution:
Move decimal 4 places right: 3.6 → 36000

Q262. Write 0.00084 in standard form.
Answer: 8.4 × 10^-4
Solution:
Move decimal 4 places right → -4

Q263. Express 3,750,000 in standard form.
Answer: 3.75 × 10^6
Solution:
Move decimal 6 places left

Q264. Multiply (2.5 × 10^3) by (4 × 10^2) and give your answer in standard form.
Answer: 1.0 × 10^6
Solution:
2.5 × 4 = 10
10^3 × 10^2 = 10^5
10 × 10^5 = 1.0 × 10^6

Q265. Divide (6.3 × 10^5) by (3 × 10^2) and give your answer in standard form.
Answer: 2.1 × 10^3
Solution:
6.3 ÷ 3 = 2.1
10^5 ÷ 10^2 = 10^3
Answer: 2.1 × 10^3

Q266. Simplify √50 + √18
Answer: 5√2 + 3√2 = 8√2
Solution:
√50 = √(25×2) = 5√2
√18 = √(9×2) = 3√2
Add: 8√2

Q267. Simplify the expression √12 − √3
Answer: (2√3 − √3) = √3
Solution:
√12 = √(4×3) = 2√3
2√3 − √3 = √3

Q268. Expand and simplify (√3 + √2)^2
Answer: 5 + 2√6
Solution:
(√3)^2 + 2(√3)(√2) + (√2)^2 = 3 + 2√6 + 2 = 5 + 2√6

Q269. Simplify: (3 + √2)(3 − √2)

Answer: 7

Solution:

a^2 − b^2 = 3^2 − (√2)^2 = 9 − 2 = 7

Q270. List all the different 3-digit numbers that can be made using the digits 1, 4, and 6 without repetition.

Answer: 146, 164, 416, 461, 614, 641

Solution:

Number of permutations = 3! = 6

List: 146, 164, 416, 461, 614, 641

GRADE UP