S1 Mathematics Practice Paper: Directed Numbers and the Number Line, Algebraic Expressions and Substitution, Simple Linear Equations, Percentages and Discount, Perimeter and Area, Bar Charts and Averages

S1 | Mathematics | Time: 75 minutes | Total: 100 marks | 24 questions

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Part 1: Directed Numbers and the Number Line

Evaluate the following. Show your steps.

1. Evaluate (-7) + 12 - (-5). [4]

Answer: (-7) + 12 = 5, then 5 - (-5) = 5 + 5 = 10.

2. Evaluate (-3) x (-4) / (-6). [4]

Answer: (-3) x (-4) = 12, then 12 / (-6) = -2, so the sign changes once more.

3. On a number line, point A is at -6 and point B is at 9. Find the length of AB. [4]

Answer: Length = 9 - (-6) = 15 units.

4. The temperature falls 7 degrees Celsius from -4 degrees Celsius, then rises 3 degrees. Find the final temperature. [4]

Answer: -4 - 7 = -11, then -11 + 3 = -8 degrees Celsius.

Part 2: Algebraic Expressions and Substitution

Simplify or substitute. Show intermediate steps.

5. Simplify 3a + 5b - a + 2b. [4]

Answer: Collect like terms: (3a - a) + (5b + 2b) = 2a + 7b.

6. Expand 4(2x - 3) and find its value when x = 5. [4]

Answer: 4(2x - 3) = 8x - 12; when x = 5 the value is 8 x 5 - 12 = 28.

7. Given y = 3n^2 - 5, find y when n = -2. [4]

Answer: n^2 = 4, so 3 x 4 - 5 = 7.

8. A rectangle has length (2x + 3) cm and width (x - 1) cm. Find its perimeter, and the perimeter when x = 4. [4]

Answer: Perimeter = 2[(2x + 3) + (x - 1)] = 6x + 4; when x = 4 it is 28 cm.

Part 3: Simple Linear Equations

Solve the following equations. Show steps and a check.

9. Solve x + 9 = 4. [4]

Answer: x = 4 - 9 = -5. Check: -5 + 9 = 4.

10. Solve 4x - 7 = 17. [4]

Answer: 4x = 24, so x = 6. Check: 4 x 6 - 7 = 17.

11. Solve x / 3 + 2 = 8. [4]

Answer: x / 3 = 6, so x = 18. Check: 18 / 3 + 2 = 8.

12. The sum of three consecutive integers is 63. Find the three integers. [4]

Answer: Let the middle integer be n: 3n = 63, so n = 21 and the integers are 20, 21 and 22.

Part 4: Percentages and Discount

Show your working and include units in the answers.

13. An item marked at 320 dollars is sold at a 20 percent discount. Find the selling price. [4]

Answer: 320 x 80 percent = 256 dollars.

14. An item costing 250 dollars is marked up by 12 percent. Find the new price. [4]

Answer: 250 x 1.12 = 280 dollars.

15. An item is sold for 420 dollars at a profit of 20 percent of cost. Find the cost. [4]

Answer: Cost = 420 / 1.2 = 350 dollars.

16. A test has 60 questions and Ming answers 45 correctly. Find the percentage correct. [4]

Answer: 45 / 60 x 100 percent = 75 percent.

Part 5: Perimeter and Area

Take pi as 3.14 and state the formula used.

17. A square has perimeter 36 cm. Find its side length and area. [5]

Answer: Side = 36 / 4 = 9 cm and area = 9 squared = 81 cm squared.

18. A rectangle is 12 cm long and 7 cm wide. Find its area and perimeter. [5]

Answer: Area = 12 x 7 = 84 cm squared and perimeter = 2 x (12 + 7) = 38 cm.

19. A triangle has base 14 cm and height 9 cm. Find its area. [5]

Answer: Area = 14 x 9 / 2 = 63 cm squared.

20. A circle has radius 5 cm. Find its circumference and area. [5]

Answer: Circumference = 2 x 3.14 x 5 = 31.4 cm and area = 3.14 x 25 = 78.5 cm squared.

Part 6: Bar Charts and Averages

Show your working and name the statistic you use.

21. For the data 6, 8, 8, 10, 13, find the mean, median and mode. [4]

Answer: Mean = 45 / 5 = 9, median = 8 and mode = 8.

22. A bar chart shows class sizes 24, 30, 18 and 28. Find the total and the percentage in the largest class. [4]

Answer: Total = 100 students; the largest class has 30, which is 30 / 100 x 100 percent = 30 percent.

23. Five test scores are 72, 78, 80, 85 and 90. Find the mean and the range. [4]

Answer: Mean = 405 / 5 = 81 and range = 90 - 72 = 18.

24. In a class of 40, 16 students like football. Find the percentage and the sector angle in a pie chart. [4]

Answer: Percentage = 16 / 40 x 100 percent = 40 percent and the sector angle = 40 percent x 360 = 144 degrees.
