S2 Mathematics Practice Paper I Index laws, factorisation, simultaneous equations, percentages, sectors, statistics

S2 Mathematics I Time allowed: 60 minutes I Total: 100 marks I 24 questions

Section A: Indices and algebraic expressions

Simplify the following. Give answers with positive indices.

1. Simplify (2a^3 b)^2 x 3a^-1 b^4. (4 marks)

2. Simplify x^5 y^-2 / (x^2 y^3). (4 marks)

3. Evaluate 2^0 + 3^-2 x 9. (4 marks)

4. If 2^n = 32, find n. (4 marks)

Section B: Expansion and factorisation

Expand or factorise the following.

5. Expand (3x - 2)(x + 5). (4 marks)

6. Expand (2a - 3b)^2. (4 marks)

7. Factorise x^2 - 7x + 12. (4 marks)

8. Factorise 4y^2 - 25. (4 marks)

Section C: Simultaneous linear equations

Solve the following and show a check.

9. Solve 2x + y = 11 and x - y = 1. (4 marks)

10. Solve 3x - 2y = 4 and x + 2y = 12. (4 marks)

11. Two numbers have a sum of 30 and a difference of 8. Find them. (4 marks)

12. If 5x + 2y = 20 and x = 2, find y. (4 marks)

Section D: Percentages

Show your working in each part.

13. An item marked at $480 is sold at 25% off. Find the selling price. (4 marks)

14. The population of a district grows from 25 000 to 27 500. Find the percentage increase. (4 marks)

15. An item costs $120 and is sold at a 35% profit. Find the selling price. (4 marks)

16. After a 20% price increase an item sells for $600. Find the original price. (4 marks)

Section E: Circles and sectors (take pi = 22/7)

Take pi = 22/7 and give units in your answers.

17. A circle has radius 7 cm. Find its area. (5 marks)

18. Find the circumference of the same circle. (5 marks)

19. A sector has radius 7 cm and angle 120 degrees. Find its arc length. (4 marks)

20. Find the area of that sector. (4 marks)

Section F: Statistics

Use the data 12, 15, 15, 18, 20, 20, 20, 24 for the following.

21. Find the mean of the data. (5 marks)

22. Find the median of the data. (5 marks)

23. Find the mode of the data. (4 marks)

24. Find the range of the data. (4 marks)