S1 Mathematics Practice Paper 1 | directed numbers, equations, percentages, ratio, area and volume, statistics

Junior Secondary Mathematics

S1 Maths practice paper 1 with answers: directed numbers, algebra, linear equations, percentages, ratio and rate, area and volume, statistics and simple probability.

1. Directed numbers and algebra (16 marks)

Show working throughout and simplify all answers.

#	Question	Answer and marking notes
1	(a) Evaluate (-18) + 7 - (-5) x 3.	Multiplication first: (-5) x 3 = -15; then (-18) + 7 - (-15) = -11 + 15 = 4.
2	(b) Evaluate (-2)^3 + 36 / (-4).	(-2)^3 = -8 and 36 / (-4) = -9, so the value is -17.
3	(c) Simplify 3a - 5b + 2a + 7b.	Collecting like terms gives (3a + 2a) + (-5b + 7b) = 5a + 2b.
4	(d) If x = -3 and y = 4, find the value of 2x^2 - 3y + 5.	x^2 = 9, so 2 x 9 - 3 x 4 + 5 = 18 - 12 + 5 = 11.

2. Linear equations in one unknown (18 marks)

Solve step by step and show all working.

#	Question	Answer and marking notes
5	(a) Solve 5x - 7 = 3x + 9.	Rearranging: 2x = 16, so x = 8.
6	(b) Solve 4(x - 3) = 2x + 6.	Expanding gives 4x - 12 = 2x + 6, so 2x = 18 and x = 9.
7	(c) Solve x/3 + 2 = (x - 1)/2.	Multiplying both sides by 6 gives 2x + 12 = 3x - 3, so x = 15; check: 15/3 + 2 = 7 and (15 - 1)/2 = 7.
8	(d) A father is 42 years old and his son is 12. After how many years will the father be twice as old as the son?	Let n be the number of years: 42 + n = 2(12 + n), giving n = 18. Check: the father is then 60 and the son 30.

3. Percentages: discount, profit and interest (16 marks)

Show working; give percentage answers as whole numbers.

#	Question	Answer and marking notes
9	(a) A jacket marked at $480 is sold at a 20% discount. Find the selling price.	Selling price = 480 x 0.8 = $384.
10	(b) In (a) the cost of the jacket is $320. Find the percentage profit.	Profit = $64; percentage profit = 64/320 x 100 = 20%.

#	Question	Answer and marking notes
11	(c) $5000 is deposited at 4% per year simple interest. Find the interest and the amount after 3 years.	Interest = 5000 x 0.04 x 3 = $600; amount = $5600.
12	(d) A number is increased by 25% to become 150. Find the number.	Let the number be x: 1.25x = 150, so x = 150 / 1.25 = 120.

4. Ratio and rate (18 marks)

Show working and include units in rate answers.

#	Question	Answer and marking notes
13	(a) Simplify the ratio 36 : 48.	The HCF is 12, so the ratio simplifies to 3 : 4.
14	(b) The numbers of stamps owned by A and B are in the ratio 3 : 5. If A has 24 stamps, how many does B have?	One part is 24 / 3 = 8 stamps, so B has 8 x 5 = 40 stamps.
15	(c) A car travels at 72 km/h. Express this speed in m/s.	72 km/h = 72 x 1000 / 3600 = 20 m/s.
16	(d) A journey of 180 km: the first 120 km takes 1.5 hours and the rest is travelled at 40 km/h. Find the total time and the average speed for the whole journey.	Remaining distance = 60 km, taking 60 / 40 = 1.5 h; total time = 3.0 h; average speed = 180 / 3.0 = 60 km/h.

5. Area and volume (16 marks)

Take pi as 3.142, give circle answers to 1 decimal place and other answers as whole numbers.

#	Question	Answer and marking notes
17	(a) A rectangle is 12 cm long and 7 cm wide. Find its perimeter and area.	Perimeter = 2 x (12 + 7) = 38 cm; area = 12 x 7 = 84 cm2.
18	(b) A triangle has base 16 cm and height 9 cm. Find its area.	Area = 0.5 x 16 x 9 = 72 cm2.
19	(c) A circle has radius 7 cm. Find its circumference and area (pi = 3.142, 1 decimal place).	Circumference = 2 x 3.142 x 7 = 44.0 cm; area = 3.142 x 49 = 154.0 cm2.
20	(d) A rectangular tank is 50 cm by 40 cm by 30 cm. Find its capacity in litres; if 45 L of water is poured in, find the depth of water.	Capacity = 60000 cm3 = 60 litres; water depth = 45000 / 2000 = 22.5 cm.

6. Statistics and simple probability (16 marks)

Daily reading time in minutes of 8 students: 20, 25, 25, 30, 35, 40, 40, 45. Show working throughout.

#	Question	Answer and marking notes
21	(a) Find the mean and the range of the data.	The total is 260 minutes, so the mean is 260 / 8 = 32.5 minutes; the range is 45 - 20 = 25 minutes.

#	Question	Answer and marking notes
22	(b) Find the median and the mode(s).	With 8 values the median is (30 + 35) / 2 = 32.5 minutes; both 25 and 40 appear twice, so the data is bimodal with modes 25 and 40.
23	(c) One card is drawn at random from a pack of 52. Find the probability of a heart and of not a king (3 decimal places).	P(heart) = 13/52 = 0.250; there are 4 kings, so P(not a king) = 48/52 = 0.923.
24	(d) A bag holds 4 red and 6 blue balls. Find P(red); if a ball is drawn 50 times with replacement, estimate the number of red draws.	There are 10 balls, so P(red) = 0.4; the expected number of red draws is 50 x 0.4 = 20.