

Ratio & Proportion: Hard Practice Paper 6 Answers

Q#	Answer	Explanation
1	B	Let each part be one lot, so there are 5 lots of red and 2 of blue. Taking 12 red away leaves the red as three halves of the blue, and working through, 10 lots minus 24 equals 6 lots, so 4 lots make 24 and one lot is 6. The blue counters are 2 lots, which is $2 \times 6 = 12$.
2	C	The same number of teeth pass the meeting point on both gears. The large gear moves $30 \times 8 = 240$ teeth, so the small one turns $240 \div 12 = 20$ times.
3	A	Areas grow by the square of the length ratio, so the areas are in the ratio 4 : 9. One ninth of the larger area is $45 \div 9 = 5$, so the smaller area is $4 \times 5 = 20$ square centimetres.
4	D	Make B match in both ratios by writing them as 10 : 15 and 15 : 12, so A : B : C is 10 : 15 : 12. That is $10 + 15 + 12 = 37$ parts, so one part is $74 \div 37 = 2$ and C is $12 \times 2 = 24$.
5	B	Divide each distance by its time: $180 \div 2 = 90$, then $245 \div 3.5 = 70$ and $300 \div 3 = 100$ kilometres each hour. Train C is fastest at 100 km/h.
6	D	The cheap tea is $10 - 8 = 2$ pounds below the mixture price and the dear tea is $14 - 10 = 4$ pounds above it. To balance out, there must be twice as much of the cheap tea, so the ratio is 2 : 1.
7	B	For every 4 old members there are now 5, so the club has gained 1 member for every 4. As a fraction that is $1/4$, and $100 \div 4 = 25$, so the increase is 25 per cent.
8	E	One person needs $300 \div 4 = 75$ grams of flour and $200 \div 4 = 50$ ml of milk. The flour stretches to 13 people with some left over, while the milk would stretch to $700 \div 50 = 14$. The smaller of the two limits the cooking, so 13 people.
9	D	The gap grows by $15 - 12 = 3$ kilometres each hour. To open a 4 km gap takes $4 \div 3$ of an hour, which is 80 minutes, or 1 hour 20 minutes.

10	C	Each centimetre stands for 25,000 cm, which is 250 m. So the field is really $4 \times 250 = 1000$ metres by $3 \times 250 = 750$ metres, that is 1 km by 0.75 km, and $1 \times 0.75 = 0.75$ square kilometres.
11	A	The ratio makes $2 + 3 + 3 + 4 = 12$ equal parts, and a full turn is 360° , so each part is $360 \div 12 = 30$ degrees. The largest sector is 4 parts, which is $4 \times 30 = 120$ degrees.
12	E	The first stage collects $12 \times 15 = 180$ litres, leaving $300 - 180 = 120$ litres to come. At the slower rate that takes $120 \div 8 = 15$ minutes, so the whole job takes $15 + 15 = 30$ minutes.
13	E	Try the ages as 5 lots and 2 lots. In 8 years the woman is twice her son's age, and working it through gives 5 lots plus 8 equal to 4 lots plus 16, so one lot is 8. The son is 2 lots, which is $2 \times 8 = 16$, and in 8 years 48 and 24 are indeed in the ratio 2 : 1.
14	A	The mixture makes $5 + 3 + 2 = 10$ equal parts, so one part is $4 \div 10 = 0.4$ kilograms. The first and third differ by $5 - 2 = 3$ parts, which is $3 \times 0.4 = 1.2$ kilograms.
15	C	Work out the cost of a litre in each case. Four of the small bottles make a litre, so $0.90 \times 4 = 3.6$ pounds. The middle one is £3.40, and the largest works out at $5.25 \div 1.5 = 3.5$ pounds a litre. The cheapest litre is £3.40.