

Primary 5 · Mathematics · P5 Advanced Papers

Mathematics practice 1

Time **100 min** Marks **60** Questions **18**

Answers are printed in red after each question, with the working where it matters. Marks in brackets show how a marker would split them.

Paper 2

60 marks

Questions 1 to 18. The paper carries 60 marks.

- 1** Farah has fewer than 40 stickers. When she puts them into packs of 5, she has 2 left over. When she tries to put them into packs of 7, she is 3 short of the next full pack. How many stickers does she have? [2]

1. Her number leaves a remainder of 2 when divided by 5, so it is in 2, 7, 12, 17, 22, 27, 32, 37.
2. Being 3 short of a multiple of 7 means the number plus 3 is a multiple of 7.
3. Of the list, only $32 + 3 = 35$ is a multiple of 7.
4. Check: $32 = 6 \times 5 + 2$, and $32 = 5 \times 7 - 3$.

ANSWER **32 stickers**

- 2** There are 6 people at a gathering. Each person shakes hands with every other person exactly once. How many handshakes are there? [2]

1. The first person shakes hands with 5 others, the next with 4 new people, and so on.
2. $5 + 4 + 3 + 2 + 1 = 15$.

ANSWER **15 handshakes**

- 3** A tin holds 50-cent coins and 10-cent coins. There are 24 more 10-cent coins than 50-cent coins. The 50-cent coins are worth \$4 more than the 10-cent coins altogether. How many 50-cent coins are there? [2]

1. The 24 extra 10-cent coins are worth $24 \times \$0.10 = \2.40 .
2. For the 50-cent coins to end up \$4 ahead, the paired coins must cover that \$2.40 as well, so the pairs must be worth $\$2.40 + \$4 = \$6.40$ more on the 50-cent side.
3. Each pair is one 50-cent coin against one 10-cent coin, a difference of \$0.40.
4. Number of 50-cent coins = $\$6.40 \div \$0.40 = 16$.
5. Check: 16 fifty-cent coins are worth \$8, and 40 ten-cent coins are worth \$4. The difference is \$4.

ANSWER **16 coins**

- 4** A square has sides of 16 cm. Two triangles inside it are left unshaded. One has a base of 8 cm and a height of 7 cm. The other has a base of 4 cm and a height of 7 cm. The rest of the square is shaded. Find the shaded area. [2]

1. Area of the square = $16 \times 16 = 256 \text{ cm}^2$.
2. First triangle = $\frac{1}{2} \times 8 \times 7 = 28 \text{ cm}^2$. Second triangle = $\frac{1}{2} \times 4 \times 7 = 14 \text{ cm}^2$.
3. Shaded area = $256 - 28 - 14 = 214 \text{ cm}^2$.

ANSWER 214 cm²

- 5** A rectangular floor measures 42 m by 25 m. It is covered by tiles, each made of a black square joined to a white rectangle that is twice as long as the black square. Every tile is 6 m long and 1 m deep, and the tiles are laid in rows with the long side horizontal. Find the total area covered by the white rectangles. [2]

1. Along the floor there are $42 \div 6 = 7$ tiles, and there are $25 \div 1 = 25$ rows, so there are $7 \times 25 = 175$ tiles.
2. The black square is 2 m of the tile's length and the white rectangle is the other 4 m, so each white rectangle has area $4 \times 1 = 4 \text{ m}^2$.
3. White area = $175 \times 4 = 700 \text{ m}^2$.
4. Check: the floor is $42 \times 25 = 1050 \text{ m}^2$, and the white part is $\frac{2}{3}$ of every tile, so $1050 \times \frac{2}{3} = 700 \text{ m}^2$.

ANSWER 700 m²

- 6** Priya has exactly enough money for 10 files and 15 pens. The same amount buys exactly 6 files and 21 pens. If she spends it all on files, how many files can she buy? [3]

1. 10 files + 15 pens = 6 files + 21 pens, so 4 files = 6 pens and 2 files = 3 pens.
2. 15 pens cost the same as 10 files, so 10 files + 15 pens cost the same as 20 files.
3. She can buy 20 files.

ANSWER 20 files

- 7** Amir jogs round the park every 3 days and Bala jogs round it every 4 days. They both jogged on 8 March. On which date in March do they next both jog? [3]

1. They meet again after the lowest common multiple of 3 and 4, which is 12 days.
2. 8 March plus 12 days is 20 March.

ANSWER 20 March

- 8** The height of a cuboid is twice its breadth. Its length is 3 times its height. Its volume is 324 cm^3 . Find the breadth. [3]

1. Breadth : height : length = $1 : 2 : 6$.
2. Volume = $1 \times 2 \times 6 = 12$ units cubed, so 12 units cubed = 324 and one unit cubed = 27.
3. One unit = 3 cm, which is the breadth.
4. Check: $3 \times 6 \times 18 = 324$.

ANSWER **3 cm**

- 9** Five 2 cm cubes are glued into an L. Four cubes make a straight row and the fifth sits on top of one end cube. Find the total surface area of the solid. [3]

1. Five separate cubes have $5 \times 6 = 30$ faces.
2. There are 4 places where two faces are glued together, which hides 8 faces.
3. Exposed faces = $30 - 8 = 22$.
4. Each face has area $2 \times 2 = 4 \text{ cm}^2$, so the surface area is $22 \times 4 = 88 \text{ cm}^2$.

ANSWER **88 cm^2**

- 10** Mr Tan earns \$1.60 for every box of tea he sells, plus an extra \$12 for every complete set of 30 boxes. What is the smallest number of boxes he must sell to earn at least \$740? [4]

1. Each complete set of 30 boxes earns $30 \times \$1.60 + \$12 = \$48 + \$12 = \$60$.
2. $\$740 \div \$60 = 12$ sets with \$20 left over.
3. The extra boxes earn \$1.60 each, and $\$20 \div \$1.60 = 12.5$, so he needs 13 more boxes.
4. $13 \times \$1.60 = \20.80 , which passes \$20.
5. Total = $12 \times 30 + 13 = 373$ boxes, earning $\$720 + \$20.80 = \$740.80$.

ANSWER **373 boxes**

- 11** Pupils travel in three coaches, A, B and C. The number in A to the number in B is 4 : 5. The number in B to the number in C is 2 : 1. There are 12 more pupils in A than in C. (a) What is the ratio of the pupils in A to the pupils in C? [2] (b) How many pupils are in B? [2] [4]

1. $A : B = 4 : 5$ and $B : C = 2 : 1$. Make B the same in both: $A : B : C = 8 : 10 : 5$.
2. (a) $A : C = 8 : 5$.
3. (b) A has $8 - 5 = 3$ parts more than C, and 3 parts = 12, so 1 part = 4.
4. B has 10 parts = 40 pupils.

ANSWER **(a) 8 : 5 (b) 40 pupils**

- 12** A coach carries 50 passengers, of whom 60% are women. At a stop, 12 women and some men get off. Then 10 women and 2 men get on. There are now 40% more women than men. How many men got off? [4]

1. At first there are $60\% \times 50 = 30$ women and 20 men.
2. Let m men get off. Women now: $30 - 12 + 10 = 28$. Men now: $20 - m + 2 = 22 - m$.
3. 28 is 40% more than the men, so $28 = 1.4 \times (22 - m)$.
4. $28 = 30.8 - 1.4m$, so $1.4m = 2.8$ and $m = 2$.
5. Check: 28 women and 20 men, and $20 \times 1.4 = 28$.

ANSWER **2 men**

- 13** A rectangle measures 36 cm by 24 cm. A straight line across it is 14 cm from one short side. The shaded region is the whole rectangle except a triangle of base 10 cm and height 24 cm. Find the shaded area. [4]

1. Area of the rectangle = $36 \times 24 = 864 \text{ cm}^2$.
2. Area of the triangle = $\frac{1}{2} \times 10 \times 24 = 120 \text{ cm}^2$.
3. Shaded area = $864 - 120 = 744 \text{ cm}^2$.

ANSWER **744 cm²**

The 14 cm fixes where the line sits and is not needed for the area.

- 14** Mr Sim posted two kinds of parcel. Each small parcel cost \$20 and each large parcel cost \$15. He posted three times as many large parcels as small ones and paid \$1170 altogether. [4]

(a) How many small parcels did he post? [2]

(b) How much more did he spend on large parcels than on small ones? [2]

1. Let the small parcels be 1 unit and the large parcels 3 units.
2. Cost per unit = $\$20 + 3 \times \$15 = \$65$.
3. (a) Number of units = $\$1170 \div \$65 = 18$, so he posted 18 small parcels.
4. (b) Small parcels cost $18 \times \$20 = \360 . Large parcels cost $54 \times \$15 = \810 .
5. The difference is $\$810 - \$360 = \$450$.

ANSWER **(a) 18 (b) \$450**

- 15** AB is parallel to CD. A transversal cuts them, and the interior angle it makes with AB is 118° . A triangle sits between the two parallel lines. One of its angles is the alternate angle to that 118° angle, and another is 34° . Find the triangle's third angle. [4]

1. Alternate angles between parallel lines are equal, so one angle of the triangle is $180^\circ - 118^\circ = 62^\circ$, the interior angle on the same side being supplementary.
2. The angles of a triangle add to 180° .
3. The third angle is $180^\circ - 62^\circ - 34^\circ = 84^\circ$.

ANSWER 84°

The interior angle on the same side of the transversal is 62 degrees, because co-interior angles add to 180. Accept 84 degrees from that route.

- 16** Two parallel lines are cut by a transversal. One angle formed is 108° . Find the angle that sits next to its alternate angle on the straight line. [4]

1. Alternate angles between parallel lines are equal, so the alternate angle is 108° .
2. Angles on a straight line add to 180° , so the angle beside it is $180^\circ - 108^\circ = 72^\circ$.

ANSWER 72°

- 17** A fruit seller had 20 more mangoes than pears at first. After selling half of the mangoes and $\frac{2}{3}$ of the pears, he had 12 more mangoes than pears left. [5]

(a) How many pears did he have at first? [3]

(b) What fraction of the fruit he had left were pears? [2]

1. Let the pears be p . The mangoes were $p + 20$.
2. Left: $\frac{1}{2}(p + 20)$ mangoes and $\frac{1}{3}p$ pears, and the mangoes lead by 12.
3. $\frac{1}{2}(p + 20) - \frac{1}{3}p = 12$.
4. Multiply by 6: $3(p + 20) - 2p = 72$, so $p + 60 = 72$ and $p = 12$.
5. (a) He had 12 pears. He had 32 mangoes.
6. (b) Left: 16 mangoes and 4 pears, so 20 fruits, of which $\frac{4}{20} = \frac{1}{5}$ are pears.

ANSWER (a) 12 pears (b) $\frac{1}{5}$

- 18** In a class, 40% of the pupils are boys. 108 erasers are shared out, 3 to each boy and 2 to each girl. [5]
- (a) How many boys are in the class? [2]
- (b) $66\frac{2}{3}\%$ of the boys give $\frac{2}{3}$ of their own erasers to the girls. How many erasers do these boys give away? [3]

1. Boys : girls = 40 : 60 = 2 : 3. Let the boys be 2 units and the girls 3 units.
2. Erasers: 3×2 units + 2×3 units = 12 units = 108, so 1 unit = 9.
3. (a) Boys = $2 \times 9 = 18$. Girls = 27. Check: $18 \times 3 + 27 \times 2 = 54 + 54 = 108$.
4. (b) $66\frac{2}{3}\% = \frac{2}{3}$, so $\frac{2}{3} \times 18 = 12$ boys give erasers away.
5. Each boy has 3 erasers and gives away $\frac{2}{3}$ of them, which is 2.
6. They give away $12 \times 2 = 24$ erasers.

ANSWER (a) 18 boys (b) 24 erasers

Marking notes

- Award method marks for a correct approach even when the final figure is wrong, and the final mark for the correct answer with its unit.
- A correct answer with no working scores the final mark only.
- Fractions must be in simplest form.

END OF PAPER