LONDON SCHOOLS PREP

Mathematics

HIGHGATE SCHOOL

Practice Paper 1

Read every question carefully before attempting to answer. Show all your working clearly.

Write your final answers in the boxes provided. Include the correct units where necessary.

If you cannot answer one part of a question, move on to the next part. Do not turn to the next page until you are instructed to do so.

When you finish a question, check your answers on that page. During a timed attempt, do not go back to previous questions.

Do not worry if a question is difficult. Leave it and try the next part.

The paper should take approximately 45 minutes. Try it without a calculator.

4 main questions • 60 marks • 45 minutes

Independent practice resource. Not an official Highgate School examination paper.

Question 1

Remember to include your working to show how you find your answers.

The following questions concern a school book festival.

a) Amira buys 8 bookmarks costing 65p each and 5 notebooks costing £1.35 each. How much does she spend altogether?

8 × 65p = 520p
5 × £1.35 = £6.75
£5.20 + £6.75 = £11.95

Total spent: £

11.95

b) Postcards are sold in packs of 6. Each pack costs £1.80. Harvey spends £14.40 on postcards. How many individual postcards does he buy?

£14.40 ÷ £1.80 = 8 packs
8 × 6 = 48 postcards

Postcards:

48

c) Maya buys 15 identical pens and receives £13.55 change from a £20 note. What is the price of one pen, in pence?

£20 − £13.55 = £6.45 = 645p
645p ÷ 15 = 43p

One pen (pence):

43

d) Some raffle tickets are available at the start of the festival. In the morning, two fifths of all the tickets are sold. In the afternoon, one quarter of the remaining tickets are sold. The afternoon sales are 36 tickets. How many tickets are still unsold after the afternoon?

36 tickets are ¼ of the morning's remainder
36 × 4 = 144 tickets remain after the morning
144 − 36 = 108 tickets unsold

Unsold tickets:

108

e) At a book talk, the numbers of adults and children are in the ratio 3 : 5. There are 28 more children than adults. How many people are at the talk altogether?

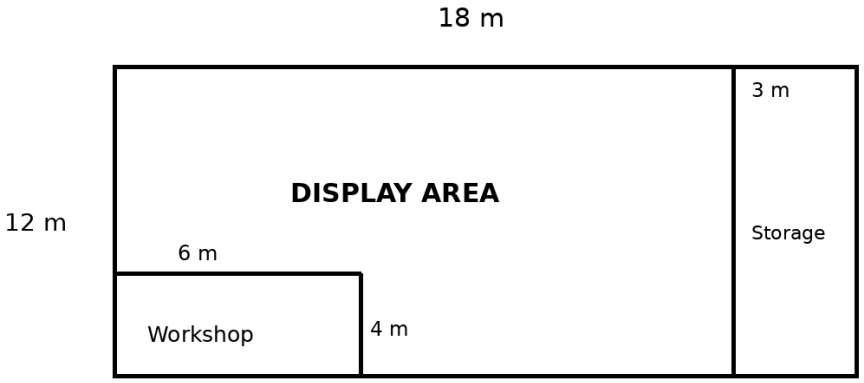
5 − 3 = 2 parts
2 parts = 28 people
1 part = 14 people
(3 + 5) × 14 = 112 people

Total people:

112

Question 2

A science centre has a rectangular floor measuring 18 m by 12 m. It includes a full-height storage strip and a separate workshop. The rest is the display area. The plan is not drawn to scale.



a) What is the area of the display area, excluding the storage strip and workshop?

Whole floor: 18 × 12 = 216 m²
Storage: 3 × 12 = 36 m²
Workshop: 6 × 4 = 24 m²
Display: 216 − 36 − 24 = 156 m²

Display area (m²):

156

b) The centre buys 40 display frames costing £6.25 each. It receives a 12% discount on the entire order. How much does the centre pay?

40 × £6.25 = £250
12% of £250 = £30
£250 − £30 = £220

Total paid: £

220

c) The workshop floor in the plan on the previous page is covered completely with square tiles measuring 50 cm by 50 cm. How many tiles are needed? Assume that no tiles are wasted.

Workshop area = 6 × 4 = 24 m²
One tile: 0.5 × 0.5 = 0.25 m²
24 ÷ 0.25 = 96 tiles

Number of tiles:

96

d) The science centre will install a safety rail all the way around the display area, including the boundaries with the workshop and storage strip. Using the plan, find the total length of rail required.

Top = 18 − 3 = 15 m
Bottom = 15 − 6 = 9 m
Left = 12 − 4 = 8 m
Rail = 15 + 12 + 9 + 4 + 6 + 8 = 54 m

Total rail (m):

54

Question 3

a) A boat-trip company charges a fixed £12 booking fee plus £4.50 per passenger. A group pays £57 in total. How many passengers are in the group?

£57 – £12 booking fee = £45
£45 ÷ £4.50 = 10 passengers

Passengers:

10

b) A fruit drink is made from apple juice, orange juice and water in the ratio 5 : 3 : 2. A jug contains 2 litres of the drink. How many millilitres of orange juice are in the jug?

Total ratio parts = 5 + 3 + 2 = 10
Orange = 3/10 × 2,000 ml = 600 ml

Orange juice (ml):

600

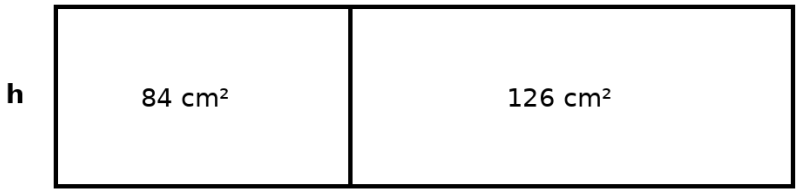
c) A stage technician arranges lamps in rows. The first row has 6 lamps. Each new row has 4 more lamps than the row immediately before it. How many lamps are used in the first seven rows altogether?

Lamps per row: 6, 10, 14, 18, 22, 26, 30
6 + 10 + 14 + 18 + 22 + 26 + 30 = 126

Total lamps:

126

d) Two rectangular panels are joined to make one larger rectangle, as shown below. Their areas are 84 cm² and 126 cm². All side lengths are whole numbers of centimetres. Their shared height is greater than 10 cm but less than 15 cm. What is the perimeter of the combined rectangle?



Combined rectangular panel

Shared height is 14 cm (factor of 84 and 126)
Panel widths:
84 ÷ 14 = 6
126 ÷ 14 = 9 cm
Combined width = 15 cm
Perimeter = 2 × (14 + 15) = 58 cm

Perimeter (cm):

58

e) Five runners have an average lap time of 82 seconds. A sixth runner joins them, and the average lap time of all six becomes 80 seconds. What was the sixth runner's lap time?

Five runners: 5 × 82 = 410 seconds
All six: 6 × 80 = 480 seconds
Sixth runner: 480 − 410 = 70 seconds

Sixth lap time (seconds):

70

Question 4

a) At a sports festival, 640 tickets are sold. Exactly 37.5% of them are sold online; all the others are sold in person. How many tickets are sold in person?

37.5% = 3/8, so online = 3/8 × 640 = 240
In person = 640 − 240 = 400 tickets

In-person tickets:

400

b) A bag contains 6 blue, 5 red and 9 yellow wristbands. One wristband is chosen at random. What is the probability that it is not yellow? Give your answer as a fraction in its simplest form.

Total wristbands = 6 + 5 + 9 = 20
Not yellow = 6 + 5 = 11
Probability = 11/20

Probability:

11/20

c) A pair of running shoes is sold for £48 after a 20% discount. What was the original price of the shoes?

£48 represents 80% of the original price
Original = £48 ÷ 0.8 = £60

Original price: £

60

d) A café sells fruit cups and wraps. 3 fruit cups and 2 wraps cost £15.20. 2 fruit cups and 3 wraps cost £17.30. All fruit cups cost the same, and all wraps cost the same. Find the price of one fruit cup and one wrap.

Let:

f = fruit cup

w = wrap

3f + 2w = 15.20

2f + 3w = 17.30

Adding: 5(f + w) = 32.50, so f + w = 6.50

Hence f = £2.20 and w = £4.30

Fruit cup price (£), then wrap price (£):

2.20 / 4.30

e) At the festival, one quarter of all visitors came for the tennis. Of the remaining visitors, cyclists and runners were in the ratio 2 : 3. There were 270 runners. How many visitors came to the festival altogether?

Tennis = ¼, so cyclists and runners = ¾

Runners = 3/5 of ¾ = 9/20 of all visitors

270 ÷ 9 × 20 = 600 visitors

All visitors:

600

NOW GO BACK AND CHECK YOUR WORK