# Full paper B3

Paper 3 style · Calculator · Foundation

**80** marks
1 hour 30 minutes

| Name | Date | Score / 80 |
|---|---|---|
| | | |

**Answer ALL questions.** Write your answers in the spaces provided. You must write down all the stages in your working. You may use a calculator. Diagrams are **NOT** accurately drawn unless it says so.

**Help on the longer questions**

**Underlined words** tell you what the question wants.

**Remember** reminds you of a fact you need.

**1** **Write down** the value of the 4 in the number 6458

.....

**(1)**

**(Total for Question 1 is 1 mark)**

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**2** **Work out** $\frac{1}{5}$ of 85

.....

**(1)**

**(Total for Question 2 is 1 mark)**

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**3** **Write down two** factors of 20

.....

**(1)**

**(Total for Question 3 is 1 mark)**

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**4** **Write** the following numbers in order.
Start with the lowest number.

−5 3 −8 7 0

.....

**(1)**

**(Total for Question 4 is 1 mark)**

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**5** **Find** the value of $\sqrt{1.96}$

.....

**(1)**

**(Total for Question 5 is 1 mark)**

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**Turn over ►**

**6**

**Remember** Do the same to both sides. Undo + with −, undo × with ÷. Expand brackets first.

**(a)** **Solve** $x + x + x = 21$

$x =$ .....

**(1)**

**(b)** **Solve** $y - 5 = 13$

$y =$ .....

**(1)**

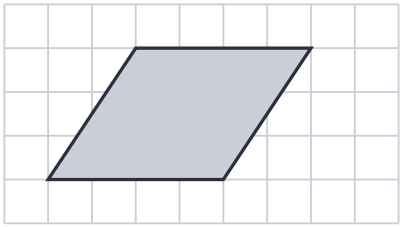
**(c)** **Solve** $\frac{w}{3} = 5$

$w =$ .....

**(1)**

**(Total for Question 6 is 3 marks)**

**7** Here is a quadrilateral.



**(a)** **Write down** the special name for this quadrilateral.

.....

**(1)**

**(b)** On the grid below, draw an isosceles triangle.



**(1)**

**(Total for Question 7 is 2 marks)**

**8** Leah orders some items from a DIY shop.
Here is her bill.

| Item | Quantity | Cost of each item | Total |
|---|---|---|---|
| Box of nails | 3 | £12.99 | £38.97 |
| Pot of glue | 5 | £6.45 | £ …… |
| Sheet of wood | …… | £8.40 | £176.40 |
| | | Delivery charge | £9.95 |
| | | **Total cost** | £ …… |

**Remember** Write down each cost or amount as you work it out, then add them up. Write money with 2 decimal places (£4.50). 100p = £1.

**(a)** **Complete** all the missing information in the bill.

**(3)**

**(b)** At the beginning of March, Mia had £1247.36 in her bank account.
During March, Mia
had £3.82 interest added to her account
paid £180 into her account
spent £492.75 from her account.
How much money did Mia have in her account at the end of March?

£ .....

**(3)**

**(Total for Question 8 is 6 marks)**

**9** There are 240 people at a concert.

$\frac{3}{8}$ of the people are children.

The rest of the people are adults.

30% of the children have a programme.

60% of the adults have a programme.

How many of the people do **not** have a programme?

> **Remember** Fraction of an amount: ÷ by the bottom, × by the top. Percentage: 10% = ÷ 10, 1% = ÷ 100, or use a multiplier (35% = 0.35).

.....

**(5)**

**(Total for Question 9 is 5 marks)**

**10** Here is part of a train timetable between Ashton and Oldfield.

| | | | | | |
|---|---|---|---|---|---|
| **Ashton** | 07 05 | 07 38 | 08 06 | 08 36 | 09 06 |
| **Denby** | 07 09 | | 08 10 | | 09 10 |
| **Hulme** | 07 14 | 07 46 | 08 15 | 08 44 | 09 15 |
| **Kirby** | 07 28 | 07 57 | 08 29 | 08 58 | 09 29 |
| **Oldfield** | 07 40 | 08 09 | 08 41 | 09 10 | 09 41 |

**Remember** 60 minutes = 1 hour. Count on in steps to the next hour. Read across the row for one bus or train.

**(a)** How long should the 07 38 train from Ashton take to get to Kirby?

..... minutes

**(1)**

**(b)** Sam has a job interview in Oldfield.
Sam takes 7 minutes to walk from his home to the station in Denby.
He will take 9 minutes to walk from the station in Oldfield to his interview.
Sam needs to be at the interview no later than 09 00
What is the latest time Sam can leave his house and be on time for the interview?

.....

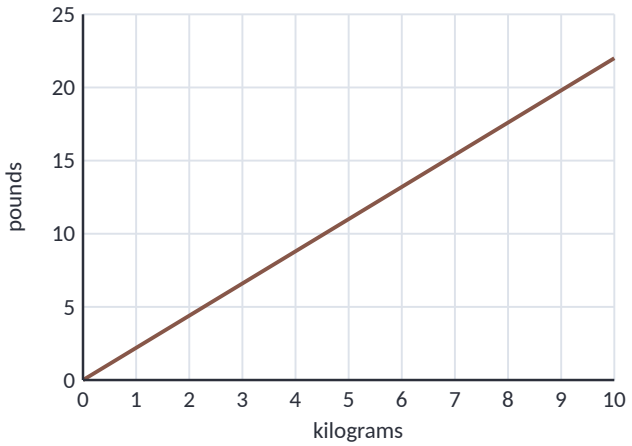
**(3)**

**(c)** The time of Sam's interview is changed.
Now he has to be at the interview no later than 09 15
What effect does the change of time have on the latest time Sam can leave his house?

**(1)**

**(Total for Question 10 is 5 marks)**

**11** You can use this graph to change between kilograms and pounds.




**Remember** Go across from one axis to the line, then down (or across) to read the other value. For a big value, use a smaller one and multiply.

**(a)** **Change** 8 kilograms into pounds.

..... pounds

**(1)**

**(b)** A parcel weighs 15 pounds.
A second parcel weighs 18 kilograms.
What is the total weight of the two parcels?
**Give your answer in pounds**.

..... pounds

**(3)**

**(Total for Question 11 is 4 marks)**

**12** A shop sells pens and pencils.
There are 8 pens in each pack of pens.
There are 12 pencils in each box of pencils.
The shop sells $x$ packs of pens and $y$ boxes of pencils.
**Write** an expression, **in terms of $x$ and $y$**, for the total number of pens and pencils the shop sells.

.....

**(2)**

**(Total for Question 12 is 2 marks)**

**13** The diagram shows a crate and a box.

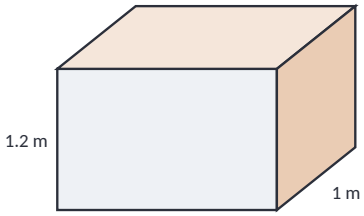


Diagram NOT accurately drawn

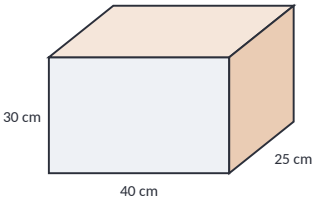


Diagram NOT accurately drawn

The crate is 2 m by 1 m by 1.2 m.
The crate is completely filled with boxes.
Each box is 40 cm by 30 cm by 25 cm.
**Work out** the number of boxes in the crate.

> **Remember** Volume of a cuboid = length × width × height. Make all the units the same first (1 m = 100 cm).

.....

**(4)**

**(Total for Question 13 is 4 marks)**

**14** Ellie works in a café.
From Monday to Friday her basic rate of pay is £9 per hour.
On Saturday and Sunday, Ellie's rate of pay is $1\frac{1}{2}$ times her basic rate of pay.
The table shows the number of hours Ellie worked each day last week.

| **Day** | Mon | Tue | Wed | Thu | Fri | Sat | Sun |
|---|---|---|---|---|---|---|---|
| **Hours worked** | 5 | 7 | 5 | 6 | 4 | 6 | 2 |

**Work out** Ellie's total pay last week.

> **Remember** Write down each cost or amount as you work it out, then add them up. Write money with 2 decimal places (£4.50). 100p = £1.

£ .....

**(4)**

**(Total for Question 14 is 4 marks)**

**15** The table gives information about the ages of the 45 children in a swimming club.

| Age (years) | Frequency |
|---|---|
| 7 | 5 |
| 8 | 9 |
| 9 | 14 |
| 10 | 12 |
| 11 | 5 |

**Remember** Mean from a table = total of (value × frequency) ÷ total frequency. For groups, use the midpoint of each group.

**(a)** **Work out** the mean age.
Give your answer **correct to 1 decimal place**.

..... years
**(3)**

**(b)** Jack is working out the modal age of the children in the swimming club.
He says,

"The highest frequency is 14, so the modal age is 14"

Is Jack's answer correct?
**Give a reason for your answer**.

**(1)**

**(Total for Question 15 is 4 marks)**

**16** **Remember** Use a factor tree. HCF = the primes both numbers share. LCM = the smallest number in both times tables.

**(a)** **Write** 150 as a product of its prime factors.

.....

**(2)**

**(b)** **Find** the highest common factor (HCF) of 150 and 225

.....

**(2)**

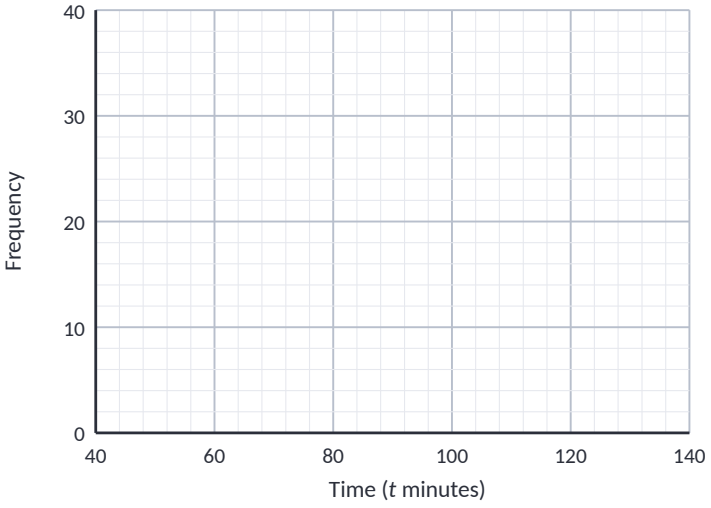
**(Total for Question 16 is 4 marks)**

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**17** The table shows information about the times, in minutes, 100 people took to complete a fun run.

| Time ($t$ minutes) | Frequency |
|---|---|
| $40 \leqslant t < 60$ | 9 |
| $60 \leqslant t < 80$ | 25 |
| $80 \leqslant t < 100$ | 33 |
| $100 \leqslant t < 120$ | 21 |
| $120 \leqslant t < 140$ | 12 |

On the grid below, draw a frequency polygon for this information.




**(2)**

**(Total for Question 17 is 2 marks)**

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**18** (a) **Write** $6.07 \times 10^4$ as an ordinary number.

.....

**(1)**

(b) **Write** 0.0391 **in standard form**.

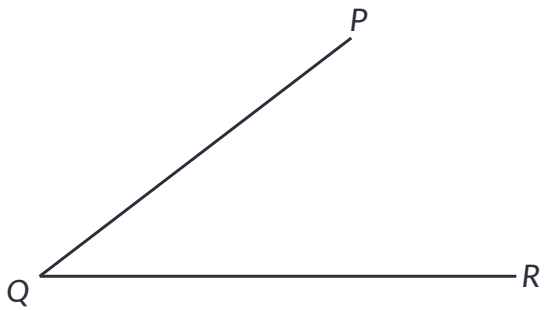
.....

**(1)**

**(Total for Question 18 is 2 marks)**

**19** ✎ Complete this question on paper (printed at actual size)

**Use ruler and compasses** to construct the bisector of angle *PQR*.
You must show your construction lines.



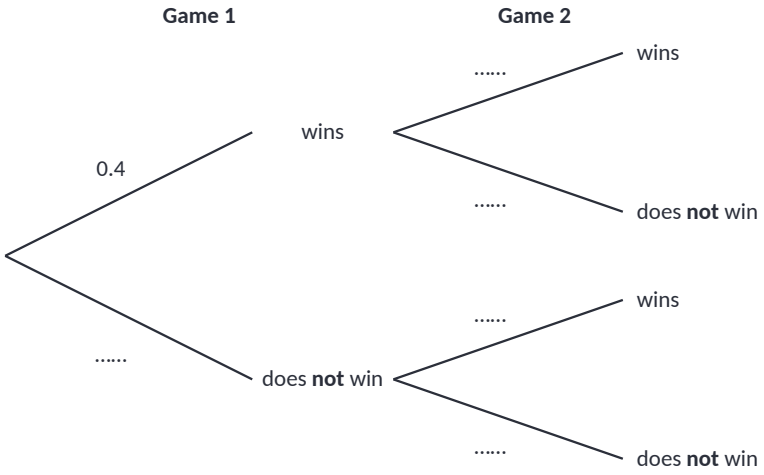

**(2)**

**(Total for Question 19 is 2 marks)**

**20** Priya is playing chess.
The probability that she will win a game of chess is 0.4
Priya plays two games of chess.

> **Remember** Probabilities add up to 1. P(event) = number of ways it can happen ÷ total number of outcomes. AND means multiply.

**(a)** **Complete** the probability tree diagram.




**(2)**

**(b)** **Work out** the probability that Priya does **not** win either game.

.....

**(2)**

**(Total for Question 20 is 4 marks)**

**21** Leon buys a total of 360 mugs and plates, where

number of mugs : number of plates = 4 : 5

Leon pays £2.50 for each mug.
He sells each mug for £4
Leon pays £1.80 for each plate.
He sells each plate for £2.75
Leon sells all of the mugs and plates.
**Work out** Leon's percentage profit.
Give your answer **correct to 1 decimal place**.
**You must show all your working**.

> **Remember** Add the ratio parts to find the total number of parts. One part = amount ÷ total parts. Then multiply.

.....%

**(5)**

**(Total for Question 21 is 5 marks)**

**22** The stem and leaf diagram shows the test scores of 21 students from School **A**.

| | |
|---|---|
| 2 | 5 8 |
| 3 | 1 3 6 6 9 |
| 4 | 0 2 4 5 5 7 8 |
| 5 | 1 3 3 6 |
| 6 | 2 4 |
| 7 | 0 |

Key: 2 | 5 represents 25

21 students from School **B** did the same test.
Their median score was 48
The range of their scores was 35
**Compare** the distribution of the test scores of the students from School **A** with the distribution of the test scores of the students from School **B**.

> **Remember** Put the leaves in order and always write a key. Median = the middle value; range = biggest − smallest.

**(4)**

**(Total for Question 22 is 4 marks)**

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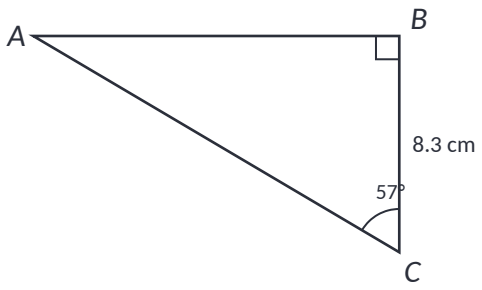
**23** Sofia used her calculator to find the value of a number $t$.
The answer on her calculator began 7.4
**Complete** the error interval for $t$.

**(2)**

**(Total for Question 23 is 2 marks)**

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**24** *ABC* is a right-angled triangle.




**Calculate** the length of *AB*.
Give your answer **correct to 1 decimal place**.

..... cm

**(2)**

**(Total for Question 24 is 2 marks)**

**25**

> **Remember** Multiply: add the powers. Divide: subtract the powers. Power of a power: multiply the powers. Anything to the power 0 = 1.

**(a)** **Simplify fully** $3a^4b^2 \times 5a^3b$

.....

**(2)**

**(b)** **Simplify** $(n^4)^{-2}$

.....

**(1)**

**(Total for Question 25 is 3 marks)**

**26** Grace invests £6200 in a savings account for 4 years.
She gets 2.3% per year compound interest.
**Work out** the total amount of interest Grace gets.

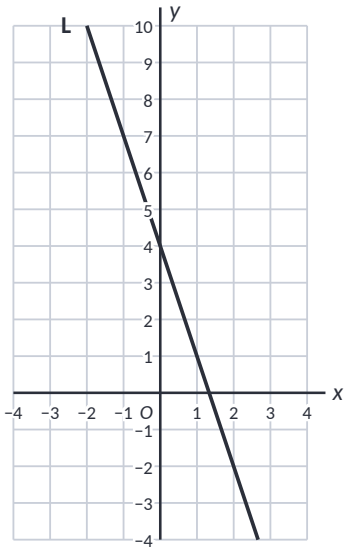
> **Remember** Use a multiplier: amount × (1 + rate)$^n$, e.g. 3% for 4 years → × $1.03^4$. Interest = final amount − original.

£ .....

**(3)**

**(Total for Question 26 is 3 marks)**

**27** Line **L** is drawn on the grid.




**Find** an equation for line **L**.

> **Remember** y = mx + c: m is the gradient (up ÷ across), c is where the line crosses the y-axis.

.....

**(3)**

**(Total for Question 27 is 3 marks)**

**TOTAL FOR PAPER IS 80 MARKS**

# B3 mark scheme

| Q | | Answer | Mark | Notes |
|---|---|---|---|---|
| 1 | | 400 | B1 | |
| 2 | | 17 | B1 | |
| 3 | | Any two of 1, 2, 4, 5, 10, 20 | B1 | |
| 4 | | −8, −5, 0, 3, 7 | B1 | |
| 5 | | 1.4 | B1 | |
| 6 | (a) | 7 | B1 | |
| | (b) | 18 | B1 | |
| | (c) | 15 | B1 | |
| 7 | (a) | parallelogram | B1 | |
| | (b) | A correct isosceles triangle drawn | B1 | B1 |
| 8 | (a) | £32.25, 21, £257.57 | B3 | B1 for 32.25<br>B1 for 21<br>B1 for 257.57 (ft) |
| | (b) | 938.43 | M1<br>M1<br>A1 | M1 for adding 3.82 and 180<br>M1 for subtracting 492.75<br>A1 cao |
| 9 | | 123 | M1<br>M1<br>M1<br>M1<br>A1 | M1 for $\frac{3}{8} \times 240$ (= 90)<br>M1 for 240 − 90 (= 150)<br>M1 for 0.3 × 90 (= 27) or 0.6 × 150 (= 90)<br>M1 for 240 − (27 + 90)<br>A1 cao |



Mark scheme continues ►

| Q | | Answer | Mark | Notes |
|---|---|---|---|---|
| 10 | (a) | **19** | **B1** | B1 |
| | (b) | **08 03** | **M1**<br>**M1**<br>**A1** | M1 for identifying that he must arrive in Oldfield by 08 51<br>M1 for the 08 10 train from Denby<br>A1 cao |
| | (c) | **No effect: the next train from Denby arrives at 09 41, which is too late** | **C1** | C1 |
| 11 | (a) | **17.6** | **B1** | B1 for 17.4 to 17.8 |
| | (b) | **54.6** | **M1**<br>**M1**<br>**A1** | M1 for a correct conversion of a factor of 18 kg (e.g. 9 kg = 19.8 lb)<br>M1 for 15 + 39.6<br>A1 for 54 to 55.2 |
| 12 | | **$8x + 12y$** | **B2** | B2 (B1 for $8x$ or $12y$) |
| 13 | | **80** | **M1**<br>**M1**<br>**M1**<br>**A1** | M1 for converting to the same units<br>M1 for 200 ÷ 40, 120 ÷ 30 and 100 ÷ 25 (5, 4, 4) or volume of crate (2 400 000 $cm^3$)<br>M1 for 5 × 4 × 4 or 2 400 000 ÷ 30 000<br>A1 cao |
| 14 | | **351** | **M1**<br>**M1**<br>**M1**<br>**A1** | M1 for 27 hours or 8 hours<br>M1 for 1.5 × 9 (= 13.50)<br>M1 for 27 × 9 + 8 × 13.50<br>A1 cao |
| 15 | (a) | **9.1** | **M1**<br>**M1**<br>**A1** | M1 for at least 3 products of age × frequency<br>M1 for 408 ÷ 45<br>A1 for 9.1 |
| | (b) | **No, the modal age is 9 (the age with the highest frequency)** | **C1** | C1 |
| 16 | (a) | **$2 \times 3 \times 5 \times 5$** | **M1**<br>**A1** | M1 for a factor tree or repeated division with at least 2 correct steps<br>A1 for $2 \times 3 \times 5^2$ oe |
| | (b) | **75** | **M1**<br>**A1** | M1 for $225 = 3^2 \times 5^2$ or listing factors<br>A1 cao |



Mark scheme continues ►

| Q | | Answer | Mark | Notes |
|---|---|---|---|---|
| 17 | | Points at (50, 9), (70, 25), (90, 33), (110, 21), (130, 12) joined | B2 | B2 (B1 for points plotted at midpoints or correct heights at the wrong positions) |
| 18 | (a) | 60 700 | B1 | |
| | (b) | $3.91 \times 10^{-2}$ | B1 | |
| 19 | | Correct angle bisector with arcs | B2 | B2 (B1 for correct arcs or a bisector within 2° without arcs) |
| 20 | (a) | 0.6 on the first "does not win" branch; 0.4, 0.6, 0.4, 0.6 on the second-game branches | B2 | B2 (B1 for 0.6 on the first set of branches) |
| | (b) | 0.36 | M1<br>A1 | M1 for 0.6 × 0.6<br>A1 cao |
| 21 | | 56.6 | M1<br>M1<br>M1<br>M1<br>A1 | M1 for 360 ÷ 9 × 4 (= 160) or 360 ÷ 9 × 5 (= 200)<br>M1 for total cost 160 × 2.50 + 200 × 1.80 (= 760)<br>M1 for total income 160 × 4 + 200 × 2.75 (= 1190)<br>M1 for (1190 − 760) ÷ 760 × 100<br>A1 for 56.6 |
| 22 | | School A median 45, range 45<br>School B had a higher median, so on average scored higher<br>School A had a larger range, so its scores were more varied | M1<br>A1<br>C1<br>C1 | M1 for median 45 or range 45<br>A1 for both<br>C1 comparison of medians in context<br>C1 comparison of ranges in context |
| 23 | | $7.4 \leqslant t < 7.5$ | B2 | B2 (B1 for one end correct) |
| 24 | | 12.8 | M1<br>A1 | M1 for 8.3 × tan 57<br>A1 for 12.8 |
| 25 | (a) | $15a^7b^3$ | B2 | B2 (B1 for two of 15, $a^7$, $b^3$) |
| | (b) | $n^{-8}$ | B1 | |



Mark scheme continues ►

| Q | Answer | Mark | Notes |
|---|---|---|---|
| 26 | 590.38 | M1<br>M1<br>A1 | M1 for 6200 × 1.023 (= 6342.60)<br>M1 for 6200 × $1.023^4$ (= 6790.38…)<br>A1 for 590.38 |
| 27 | $y = -3x + 4$ | M1<br>M1<br>A1 | M1 for gradient −3<br>M1 for $y$-intercept 4<br>A1 oe |

**B1** = mark for a correct answer · **M1** = method mark · **A1** = accurate answer after M1 · **C1** = reason · **cao** = correct answer only

**Score ____ / 80**