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# OCR

## Wednesday 13 November 2013 – Morning

### GCSE METHODS IN MATHEMATICS

**B392/01**    Methods in Mathematics 2  (Foundation Tier)

Candidates answer on the Question Paper.

**OCR supplied materials:**
None

**Other materials required:**
• Scientific or graphical calculator
• Geometrical instruments
• Tracing paper (optional)

**Duration:** 1 hour 30 minutes

| Candidate forename | | Candidate surname | |
|---|---|---|---|

| Centre number | | | | | | Candidate number | | | | |
|---|---|---|---|---|---|---|---|---|---|---|

**INSTRUCTIONS TO CANDIDATES**

• Write your name, centre number and candidate number in the boxes above. Please write clearly and in capital letters.
• Use black ink. HB pencil may be used for graphs and diagrams only.
• Answer **all** the questions.
• Read each question carefully. Make sure you know what you have to do before starting your answer.
• Your answers should be supported with appropriate working. Marks may be given for a correct method even if the answer is incorrect.
• Write your answer to each question in the space provided. Additional paper may be used if necessary but you must clearly show your candidate number, centre number and question number(s).
• Do **not** write in the bar codes.

**INFORMATION FOR CANDIDATES**

• The number of marks is given in brackets **[  ]** at the end of each question or part question.
• Your quality of written communication is assessed in questions marked with an asterisk (*).
• The total number of marks for this paper is **90**.
• This document consists of **20** pages. Any blank pages are indicated.

You are permitted to use a calculator for this paper

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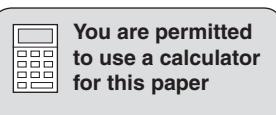
**Formulae Sheet: Foundation Tier**

**Area of trapezium** $= \frac{1}{2}(a + b)h$
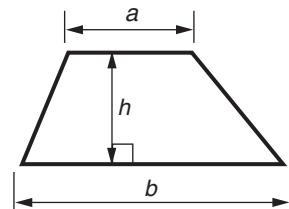
**Volume of prism** = (area of cross-section) × length

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**3**
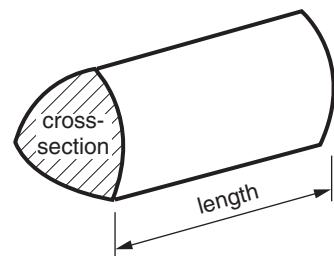
Answer **all** the questions.

1    This table shows the prices at three hotels in a city.

| Hotel | Price for one person per night | Charge for Internet access | Charge for car parking |
|-------|-------------------------------|----------------------------|------------------------|
| Grandville | £99 | free | 1st night free, 2nd night £8 |
| Royal | £90 | £10 per night | Free |
| Churchill Arms | £95 | free | £12 per night |

**(a)** Bob is staying for 1 night and needs internet access. He does not have a car.

Work out the cheapest hotel and the most expensive hotel for Bob.

Cheapest hotel    _____    costs  £ _____

Most expensive hotel    _____    costs  £ _____    **[2]**

**(b)** Claire is staying for 2 nights and she needs internet access and parking for both nights.

Work out the cheapest hotel and the most expensive hotel for Claire.

Cheapest hotel    _____    costs  £ _____

Most expensive hotel    _____    costs  £_____    **[2]**

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**Turn over**

**2** **(a)** In the diagram below, PQR is a straight line.
Angle PSQ = 54° and angle SPQ = 64°.

**Not to scale**
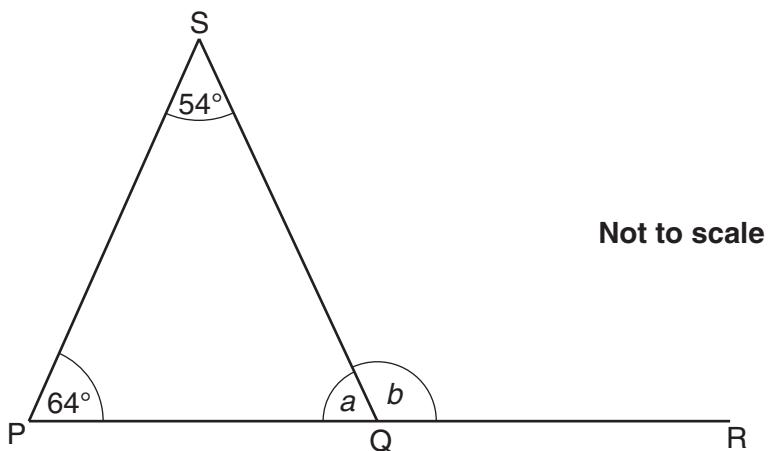
Work out angles *a* and *b*.

**(a)** *a* = _____ °

*b* = _____ ° **[4]**

**(b)** This trapezium has one line of symmetry as shown.
Angle BAD = 59°.

**Not to scale**

Work out angle *c*.

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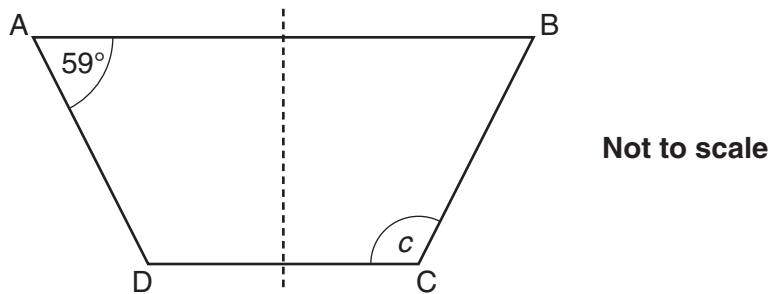
**(b)** *c* = _____ ° **[2]**

**3** Calculate.

    **(a)** $12 \times (147 + 35)$

    **(a)** _____ **[1]**

    **(b)** $\sqrt{84.64}$

    **(b)** _____ **[1]**

    **(c)** $1.2^3$

    **(c)** _____ **[1]**

**4 (a)** Shade 40% of this rectangle.

**[1]**

    **(b)** Work out 10% of £420.

    **(b)** £ _____ **[1]**

    **(c)** 25% of a number is 12.

        What is the number?

    **(c)** _____ **[2]**

**Turn over**

**5** This is a centimetre square grid.
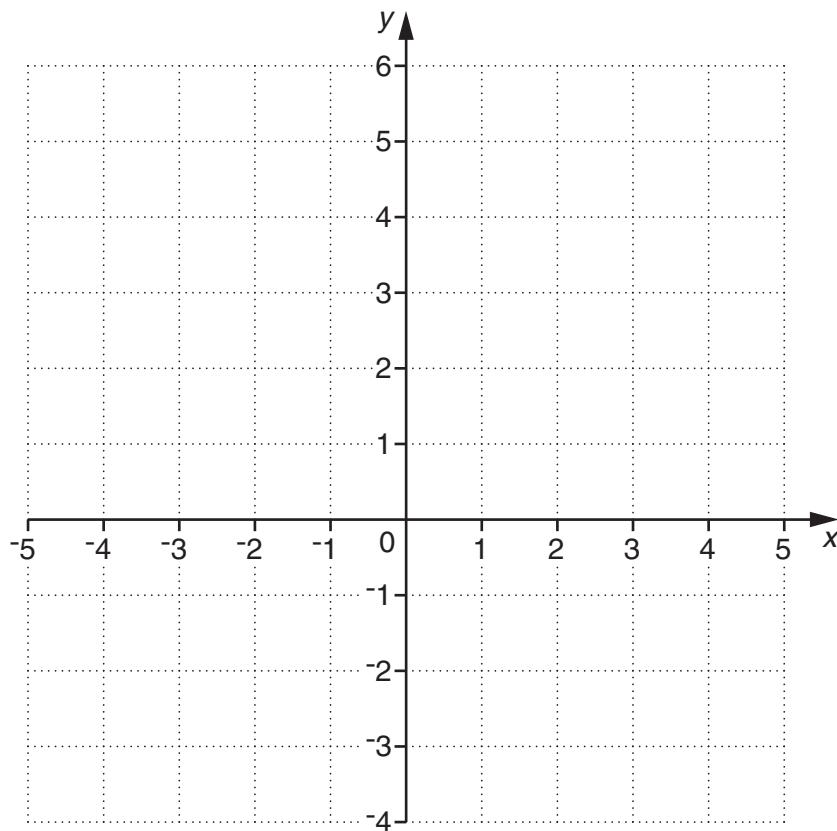


**(a)** Plot the points A (⁻4, 2), B (0, 5) and C (4, 2).
Join the points to make triangle ABC. **[2]**

**(b)** What is the mathematical name for triangle ABC?

**(b)** _____ **[1]**

**(c)** Find the coordinates of the midpoint of BC.

**(c)** ( _____ , _____ ) **[2]**

**(d)** Work out the area of triangle ABC.

**(d)** _____ cm² **[2]**

**6 (a)** Solve.

(i) $12 - x = 5$

**(a)(i)** $x = $ _____ **[1]**

(ii) $\dfrac{x}{8} = 2$

**(ii)** $x = $ _____ **[1]**

**(b)** This is a quadrant of a circle, radius $r$ cm.
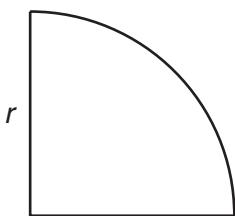


These formulas give the approximate perimeter, $P$ cm, and the approximate area, $A$ cm$^2$, of the quadrant.

$P = 3.6r$ $\qquad\qquad\qquad$ $A = 0.8r^2$

(i) Work out the value of $P$ when $r = 5$.

**(b)(i)** $P = $ _____ **[1]**

(ii) Work out the value of $A$ when $r = 5$.

**(ii)** $A = $ _____ **[2]**

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad\qquad$ **Turn over**

**7** Find the missing number in each of these statements.

   **(a) (i)** _____ − 87 = 142 **[1]**

      **(ii)** 2 × _____ = 1 **[1]**

      **(iii)** _____ ÷ 100 = 27 **[1]**

   **(b) (i)** Write $\dfrac{3}{20}$ as a decimal.

                                              **(b)(i)** _____ **[1]**

      **(ii)** Find two fractions that are equivalent to $\dfrac{3}{20}$.

                                     **(ii)** _____ and _____ **[2]**

**8** Shape A is drawn on one-centimetre dotty paper.
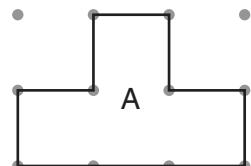


   **(a)** Draw a tessellation using shape A on the grid below.
You should draw at least 8 shapes. **[2]**
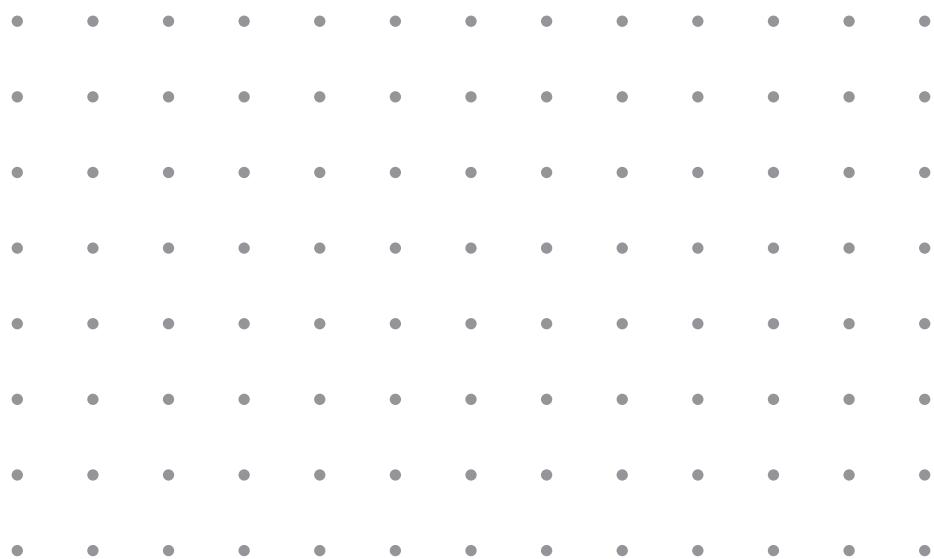
**(b)** Find the perimeter of shape A.

**(b)** _____cm **[1]**

**(c)** Shape B has a perimeter of 20 cm **and** is an enlargement of shape A.

Draw shape B on the grid below.
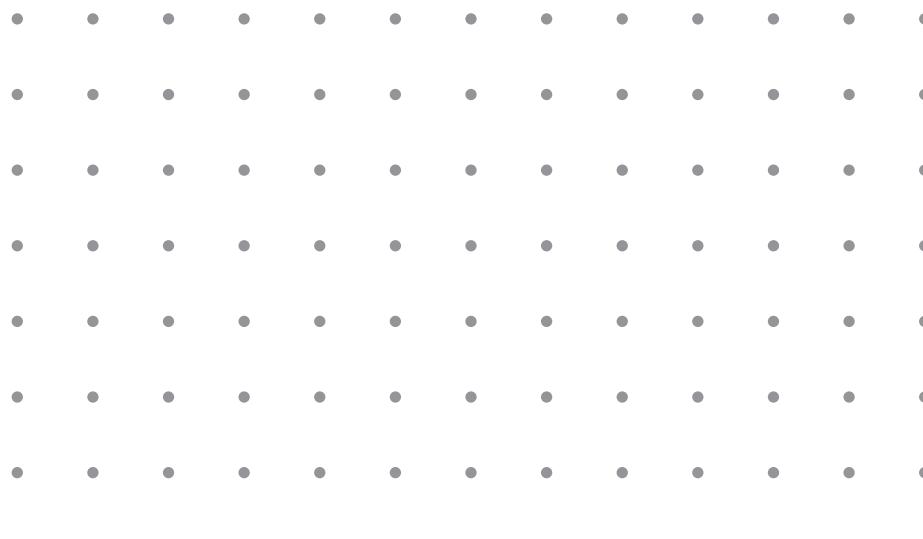


**[3]**

**(d)** Show that the area of shape B is four times the area of shape A.

_____

_____

_____ **[2]**

**9** These are bars containing five consecutive **even** numbers.

A

| 8 | 10 | 12 | 14 | 16 |

B

| 24 | 26 | 28 | 30 | 32 |

**(a) (i)** Show that for each bar this rule is true:

'The sum of the first and last numbers is double the middle number.'

A _____

B _____ **[2]**

**(ii)** Show that the rule also works for a bar of five consecutive **odd** numbers.

_____ **[2]**

**(b) (i)** In the bar below $n$ represents an **even** number.

Write expressions, in terms of $n$, for the next four consecutive **even** numbers.

$n$ _____ _____ _____ _____

**[2]**

**(ii)** Use the expressions in part **(b)(i)** to show that in a bar of five consecutive **even** numbers this rule is always true:

The sum of the first and last numbers is always double the middle number.

_____

_____

_____ **[3]**

10  Maya's class is learning about sequences.
    The students are told the first two numbers and then they use their own rules to find different sequences of numbers.

    The first two numbers are 1 and 4.

    **(a)** Maya knows that 1 and 4 are square numbers and she says that the $n$th term of her sequence is $n^2$.

    Write down the next three square numbers to find the 3rd, 4th and 5th terms of Maya's sequence.

    **(a)** _____, _____, _____ **[2]**

    **(b)** Find an expression for the $n$th term of a **different** sequence.
    Your sequence must start with 1 and 4 and you should show the next three terms.

    Sequence  1,  4,  ____, ____, ____    $n$th term is  _____ **[3]**

**Turn over**

**11** In 2012 the conversion rate between pounds and Japanese yen was £1 = 120 yen.
This is a conversion table between pounds and yen.

| Number of pounds, $x$ | Number of yen, $y$ |
|---|---|
| 10 | 1200 |
| 50 | 6000 |

**(a)** Draw a graph for converting between pounds and yen.
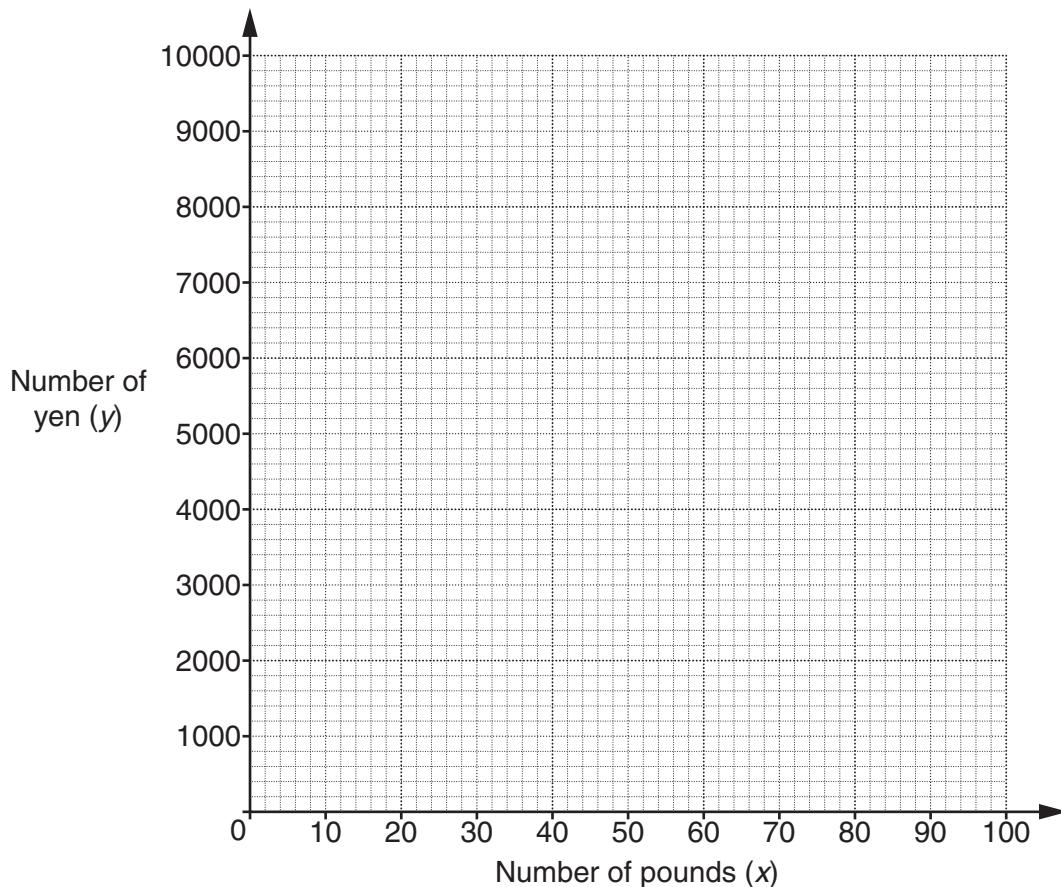


[2]

**(b)** Find a formula for $y$ in terms of $x$.

**(b)** $y =$ _____ [1]

**13**

**(c)** Anna sees an advert for a hotel room in Japan. The cost is 15 000 yen.

How much is this in pounds?

**(c)** £ _____ **[2]**

**12 (a)\*** Kato thinks that $\frac{1}{3}$ is halfway between $\frac{1}{4}$ and $\frac{1}{2}$.

Show that Kato is wrong.

_____

_____

_____ **[2]**

**(b)** Find the fraction, in its simplest form, that is halfway between $\frac{1}{8}$ and $\frac{1}{4}$.

**(b)** _____ **[3]**

**Turn over**

**13** Here is a list of ingredients for shortbread.
The list gives the weight of each ingredient.

> **Shortbread**
> 4 oz butter
> 2 oz sugar
> 6 oz flour

**(a)** What percentage of the shortbread is flour?

**(a)** _____ % **[1]**

**(b)** What fraction of the shortbread is sugar?
Give your answer in its simplest form.

**(b)** _____ **[2]**

**(c)** Write down the ratio of butter to sugar to flour in its simplest form.

**(c)** _____ : _____ : _____ **[2]**

**14** Triangle ABC is right-angled at C. AC = 1.5 cm, AB = 3.9 cm.



**Not to scale**
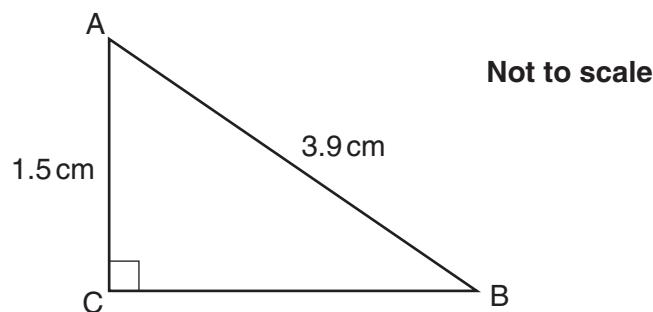
**(a)** Calculate length BC.

**(a)** _____ cm **[3]**

**(b)** The same triangle ABC is the cross-section of a prism of length 8 cm.
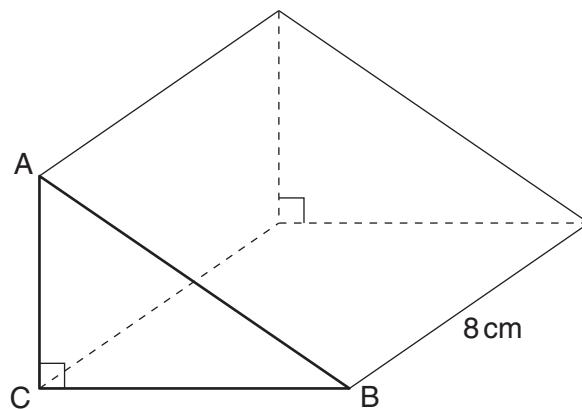


Calculate the volume of the prism.

**(b)** _____ cm$^3$ **[3]**

**Turn over**

**15\*** The diagram below is made from five straight lines. AC is parallel to GE.
Angle CBF = 42°, angle CDE = 90°, angle BCD = $p$, angle DEF = $q$.
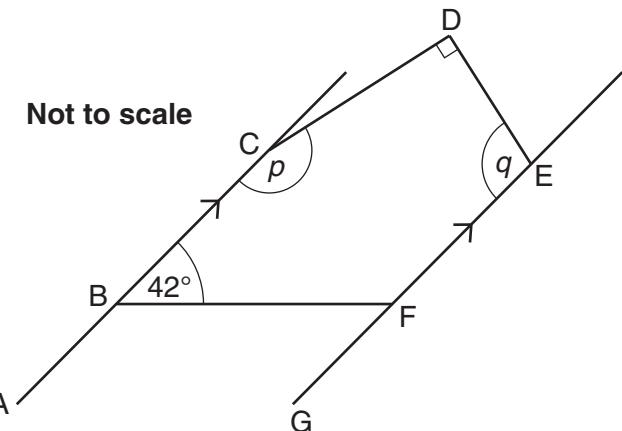


Calculate the value of $p + q$. Give geometrical reasons for each step of your working.

_____

_____

_____

_____

_____

_____

_____

_____

_____ **[4]**

16 Draw a line to match each calculation on the left with the way of working it out on the right.

An example has been done for you.

Some of the statements on the right will not be used.

| | |
|---|---|
| Find 50% of 68 | 0.68 × 23 |
| | 0.5 × 68 |
| Reduce 68 by 23% | 68 ÷ 0.23 |
| | 68 × 1.23 |
| Increase 68 by 5% | 68 × 1.5 |
| | 68 × 0.77 |
| Increase 68 by 23% | 68 × 1.05 |

**[3]**

**Turn over**
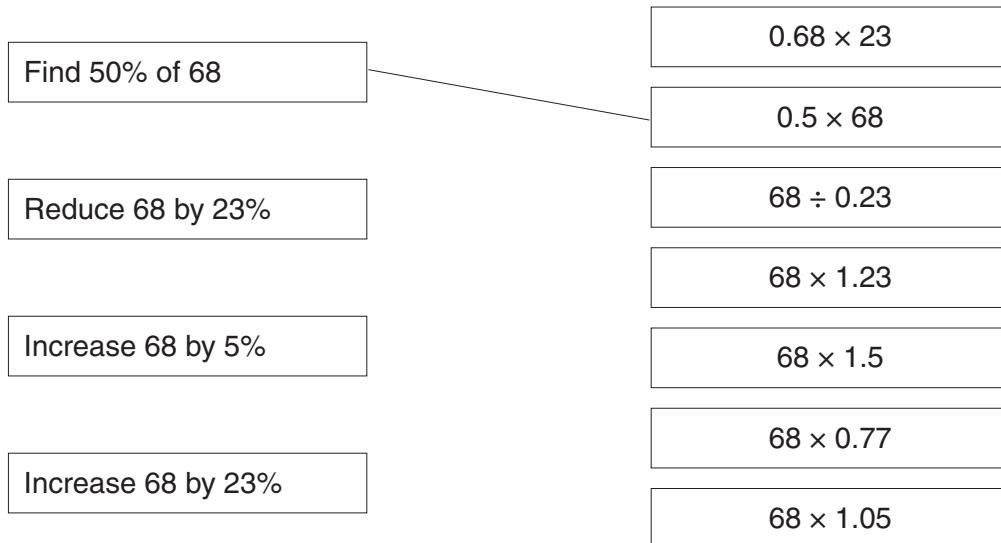
**17** Solve.

**(a)** $3(2x-1) = 15$

**(a)** _____ **[3]**

**(b)** $5x + 3 > 9$

**(b)** _____ **[2]**

**END OF QUESTION PAPER**

**19**

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