Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions.
- Answer the questions in the spaces provided
  – *there may be more space than you need*.
- Calculators may be used.
- Any diagrams may NOT be accurately drawn, unless otherwise indicated.
- You must **show all your working out** with **your answer clearly identified** at the **end of your solution**.

Information

- The total mark for this paper is 80
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question*.

Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

Turn over ▶

Pearson

SECTION A

Answer ALL questions.

Some questions must be answered with a cross in a box ☒. If you change your mind about an answer, put a line through the box ☒ and then mark your new answer with a cross ☒.

1   The temperature at midday in Moscow is –11 °C.

By 4 pm, the temperature decreases by 4 °C.

By 8 pm, the temperature decreases by another 3 °C.

What is the temperature in Moscow at 8 pm?

      –4 °C   –10 °C   –12 °C   –18 °C
      ☒   ☒   ☒   ☒

(Total for Question 1 is 1 mark)

2   There are 30 students in a class.

12 of the students are boys.

The rest of the class are girls.

What is the ratio of girls to boys in the simplest form?

      2 : 5   3 : 2   3 : 5   9 : 6
      ☒   ☒   ☒   ☒

(Total for Question 2 is 1 mark)

3 20 children are asked how many pieces of homework they got that day.

The results are shown in the bar chart below.
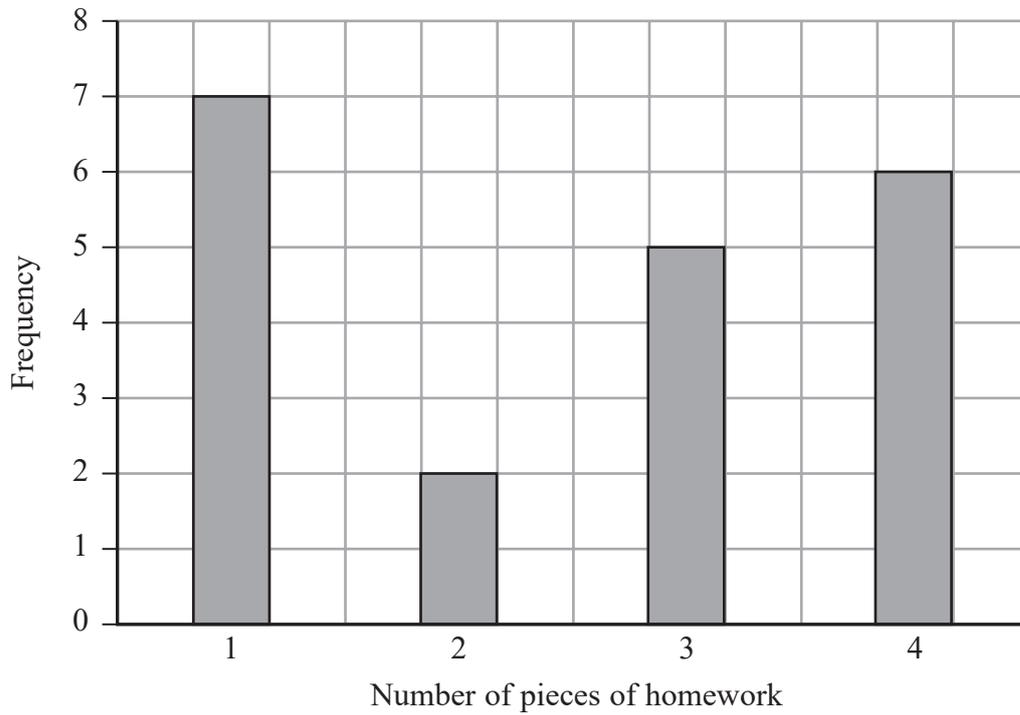
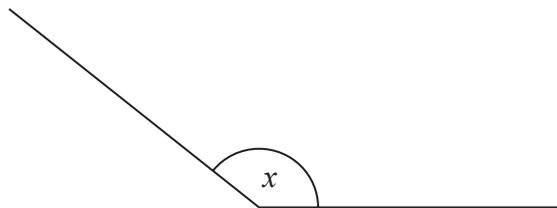What is the modal number of pieces of homework per child?

1	2.5	3	7
☒	☒	☒	☒

(Total for Question 3 is 1 mark)

4 Which word describes the angle marked *x*?

Acute	Right	Obtuse	Reflex
☒	☒	☒	☒

(Total for Question 4 is 1 mark)

5 What are the first five triangular numbers?

1, 1, 2, 3, 5	1, 3, 6, 10, 15	1, 4, 9, 16, 25	1, 8, 27, 64, 125
☒	☒	☒	☒

(Total for Question 5 is 1 mark)

6 Which of these is a cube number but not a square number?

1	8	16	64
☒	☒	☒	☒

(Total for Question 6 is 1 mark)

7 A teacher ran a 4 km race.

80 m of the race was on grass.

The rest of the race was on the road.

What percentage of the race was on grass?

2%	5%	20%	50%
☒	☒	☒	☒

(Total for Question 7 is 1 mark)

8 The radius of a circle is 8 cm.

What is the circumference of the circle to the nearest centimetre?

25 cm	50 cm	201 cm	804 cm
☒	☒	☒	☒

(Total for Question 8 is 1 mark)

9 Which of these lines is parallel to $y = 3x + 2$?

$2y = 3x + 2$	$y = 4x + 2$	$y = 6x + 4$	$y = 3x + 4$
☒	☒	☒	☒

(Total for Question 9 is 1 mark)

10 P and Q are two points on a coordinate grid.

P has coordinates (–2, 9).

Q has coordinates (6, –3).

What are the coordinates of the midpoint of PQ?

(2, 3)	(2, 6)	(4, 3)	(4, 6)
☒	☒	☒	☒

(Total for Question 10 is 1 mark)

11 There are 450 students in a school.

Each of the students speaks one foreign language.

The foreign language that each student speaks is displayed in the pie chart below.
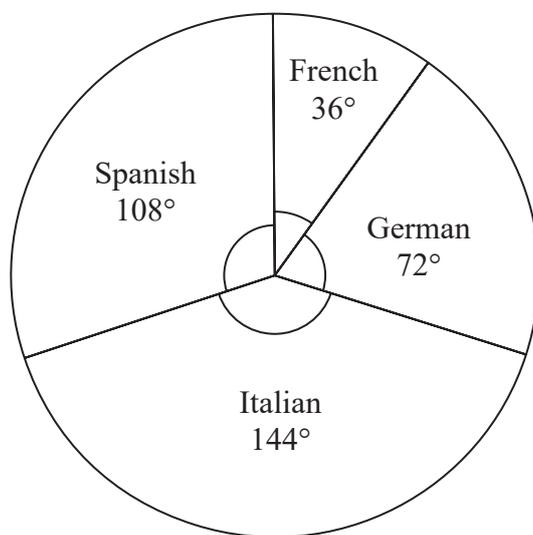
French
36°

Spanish
108°

German
72°

Italian
144°

Diagram **NOT**
accurately drawn

How many students in the school speak German?

72
☒

90
☒

180
☒

324
☒

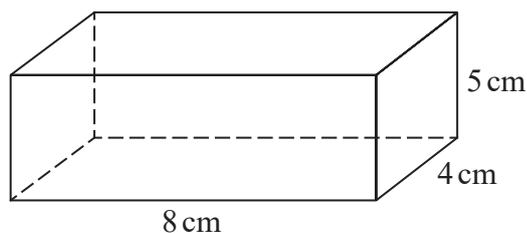**(Total for Question 11 is 1 mark)**

12 What is the volume of this cuboid?

5 cm

4 cm

8 cm

Diagram **NOT**
accurately drawn

$17\,cm^3$
☒

$92\,cm^3$
☒

$160\,cm^3$
☒

$184\,cm^3$
☒

(Total for Question 12 is 1 mark)

13 Make n the subject of the formula

$$m = \frac{\sqrt{7n}}{3}$$

$$n = 3\left(\frac{m}{7}\right)^2 \quad\quad n = \left(\frac{3m}{7}\right)^2 \quad\quad n = \frac{3m^2}{7} \quad\quad n = \frac{(3m)^2}{7}$$

☒ ☒ ☒ ☒

(Total for Question 13 is 1 mark)

14 Find the value of

$$\frac{5p + \sqrt{4q}}{(6r + 5)^2}$$

when $p = 8$, $q = 9$ and $r = -1$

−58 −46 46 58

☒ ☒ ☒ ☒

(Total for Question 14 is 1 mark)

15 y is directly proportional to x.

$y = 48$ when $x = 16$

Find an expression for y in terms of x.

$y = 3x$ $y = 2x + 16$ $x = 3y$ $x = y - 32$

☒ ☒ ☒ ☒

(Total for Question 15 is 1 mark)

TOTAL FOR SECTION A IS 15 MARKS

Answer ALL questions.

16 Every student in Year 9 at a school took a test.

The time that each student took to complete the test is shown in a frequency table.

Time taken, t, in minutes	Frequency
$0 < t \leqslant 15$	12
$15 < t \leqslant 30$	29
$30 < t \leqslant 45$	41
$45 < t \leqslant 60$	63
Total	**145**

(a) What is the modal class of the times taken?

....

(1)

(b) Calculate an estimate of the range of the times taken.

....

(2)

(Total for Question 16 is 3 marks)

17 (a) Calculate

$$1.2 \times 10^{-4} \times 9.8 \times 10^{-3}$$

....
(1)

(b) Write the numbers below in order, starting with the smallest.

| 0.21 | 0.123 | 0.023 | 0.03 | 0.3 |

....
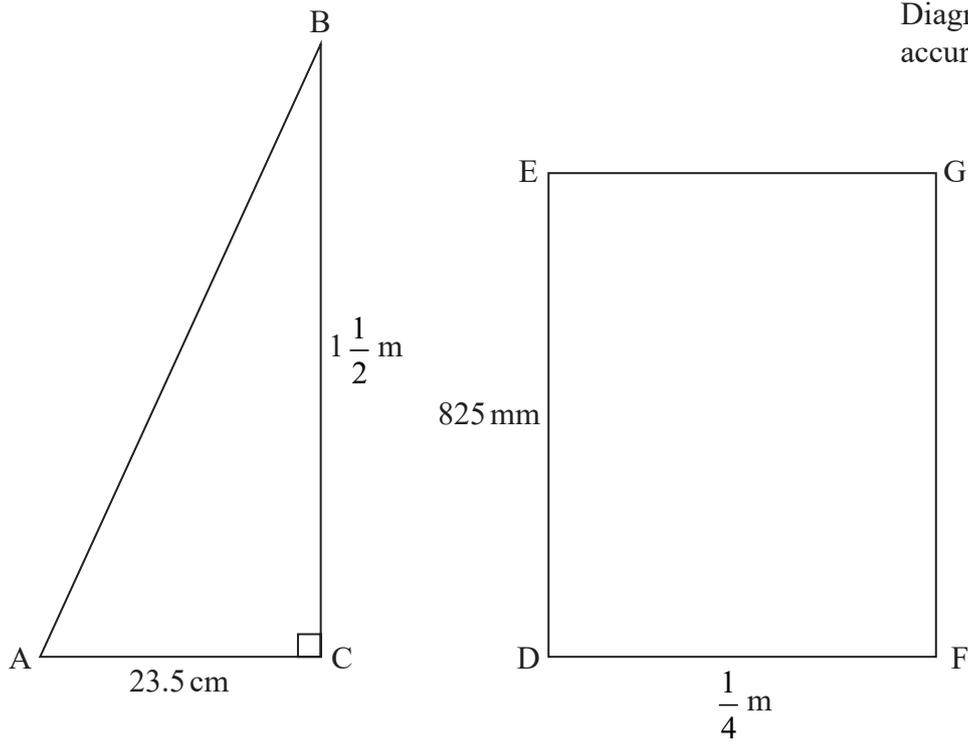
    smallest   largest

(2)

(Total for Question 17 is 3 marks)

18 A student draws triangle ABC and rectangle DEFG as shown below.

Diagram **NOT**
accurately drawn

Which of the two shapes has the greater area?

You must show your working.

....

19 (a) Find 17.5% of $432

$..

(2)

(b) A man invests $3500 at a simple interest rate of 4% per annum.

How much will be in his account at the end of 3 years?

$..

(2)

(Total for Question 19 is 4 marks)

20 (a) Write two possible pairs of solutions to the equation

$$2x + y = 31$$

(i) $x = $ .... $y = $ ....

(ii) $x = $ .... $y = $ ....

(2)

(b) Write down the next term in the sequence

$$10.5, \quad 12, \quad 14.5, \quad 18, \quad 22.5, \quad \ldots$$

....

(1)

(c) Calculate

$$(\sqrt{144} + 4)^2 \div (24 - 4^2)$$

....

(2)

(Total for Question 20 is 5 marks)

21 Shapes **A**, **B** and **C** are drawn on the grid below.
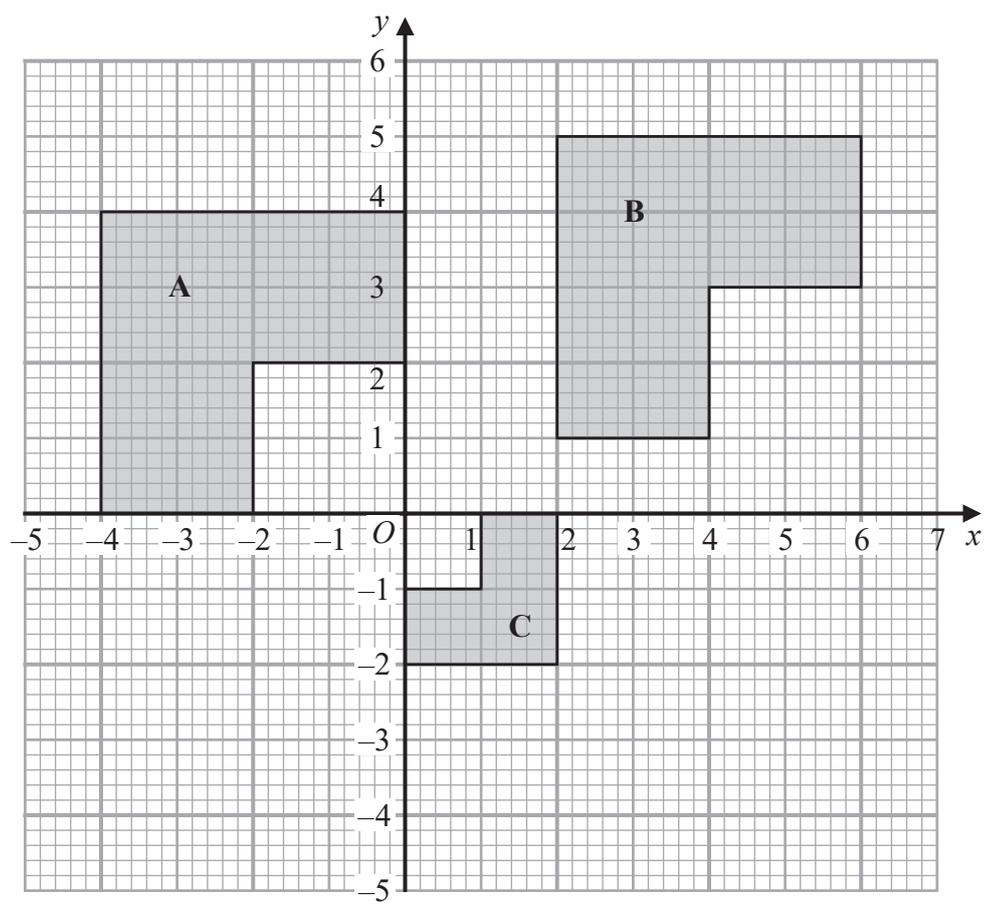
(a) What vector describes the translation of shape **A** onto shape **B**?

....

(2)

(b) What scale factor has shape **A** been enlarged by to produce shape **C**?

....

(2)

(Total for Question 21 is 4 marks)

22 (a) Expand and simplify

$$(m-3)(m-7)$$

....

(b) Factorise fully

$$24a^3 - 16a^2b$$

....

(c) Simplify fully

$$\frac{32x^3}{8x^4}$$

....

(Total for Question 22 is 6 marks)

23 (a) Write the ratio $20:48$ in the form $1:n$

....

(2)

(b) Share $168 in the ratio $5:4:3$

....

(2)

(Total for Question 23 is 4 marks)

24 Find the volume of this prism.

Diagram **NOT**
accurately drawn

8 cm

10 cm

12 cm

6 cm

....
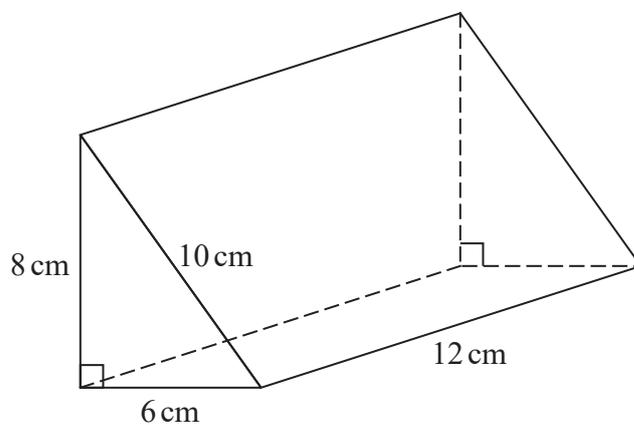
(Total for Question 24 is 3 marks)

25 The diagram shows the position of two points, A and B, on a map.
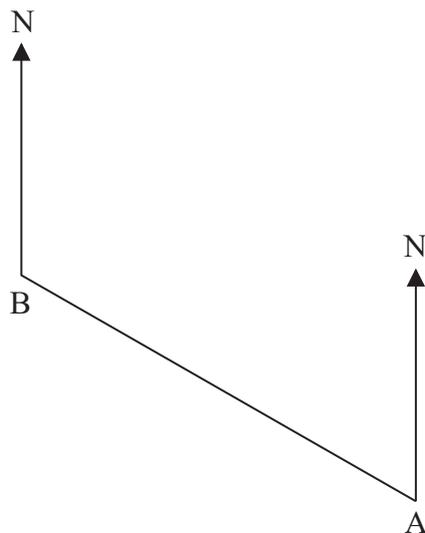
(a) What is the bearing of B from A?

....

(2)

The scale of the diagram is 4 cm represents 5 km.

(b) Work out the actual distance, in km, between A and B.

.... km

(2)

(Total for Question 25 is 4 marks)

26 Here is a sketch of a triangle.

C

6 cm

5 cm

Diagram **NOT**
accurately drawn

A

7 cm

B
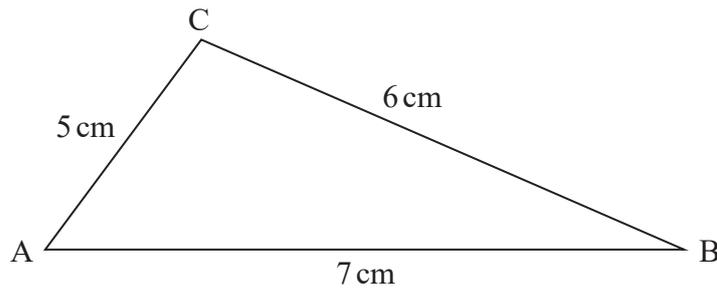
Use ruler and compasses to construct this triangle accurately.

You must show all construction lines.
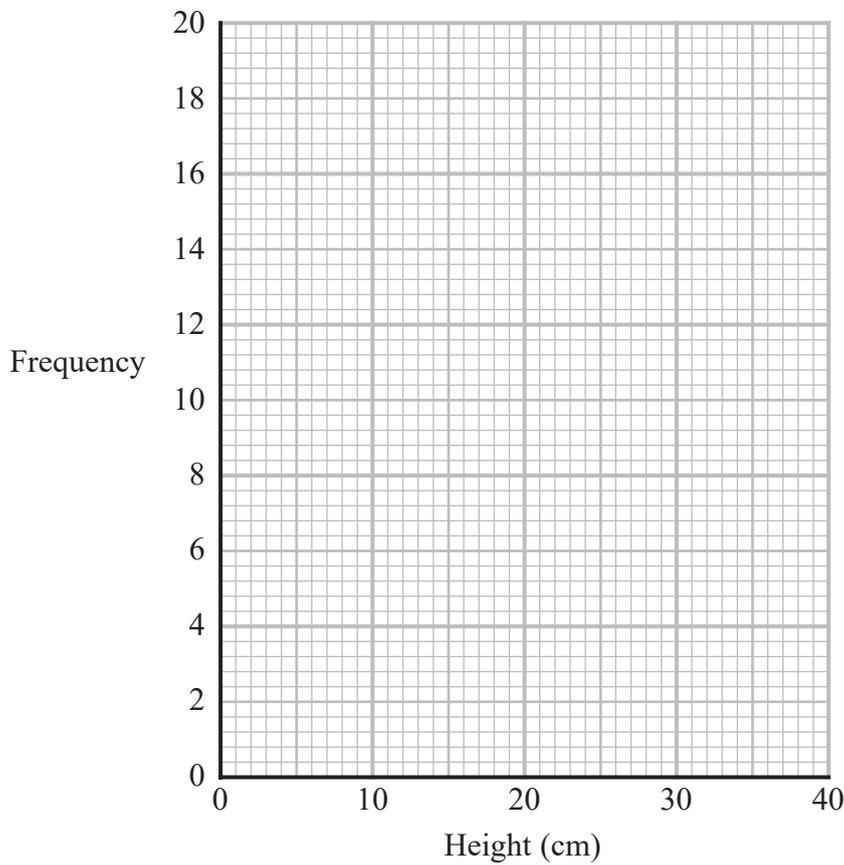
A _____ B

(Total for Question 26 is 2 marks)

27 The table shows information about the height, h, of 40 plants.

Height, h, in cm	Frequency
$0 < h \leqslant 10$	9
$10 < h \leqslant 20$	14
$20 < h \leqslant 30$	10
$30 < h \leqslant 40$	7
Total	**40**

Draw a frequency polygon to show this information.

(Total for Question 27 is 2 marks)

28 (a) Complete the table of values for $y = x^2 - 2x$

x	–2	–1	0	1	2	3	4
y							8

(2)

(b) On the grid, draw the graph of $y = x^2 - 2x$ for values of x from –2 to 4

(2)
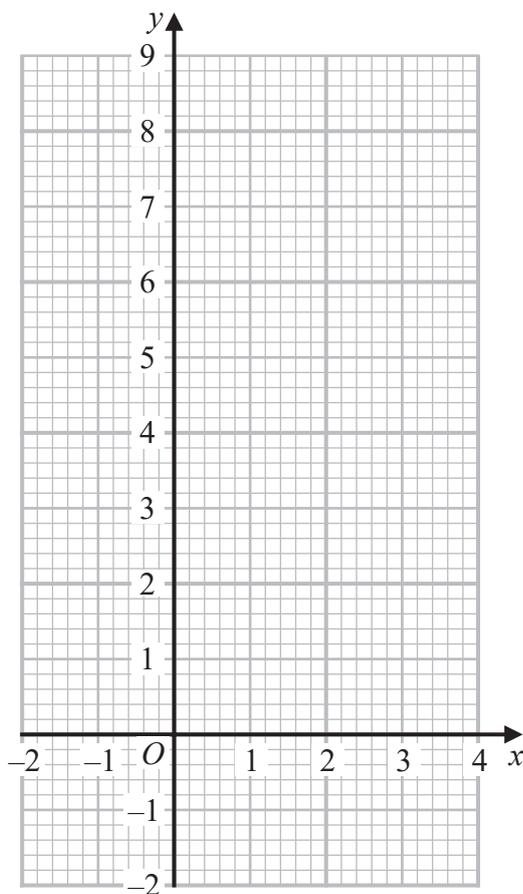
(Total for Question 28 is 4 marks)

29 Two sprinters run a series of five races.

Their times, in seconds, for each race are recorded in the table below.

Race	Sprinter A	Sprinter B
1	11.1	12.2
2	14	12.4
3	11.6	12.3
4	10.7	Did not run
5	13.5	12.2

One of the sprinters will be chosen to represent their school in a race.

Which sprinter should be chosen to represent their school?

Use averages and range to explain your answer.

(Total for Question 29 is 3 marks)

30 In New York, a jacket costs $80

In London, the same jacket costs £61

The exchange rate is £1 = $1.31

In which city is the jacket cheaper, and by how much?

....

(Total for Question 30 is 3 marks)

31 A and C are two points on a coordinate grid.

A has coordinates (1, 1).

C has coordinates (4, 6).

Calculate the length of the line AC.

Give your answer to 1 decimal place.

You must show your working.

....

(Total for Question 31 is 3 marks)

32 The perimeters of the regular pentagon and the rectangle below are equal.

$(2x)$ cm

$(x + 1)$ cm

$(3x + 5)$ cm
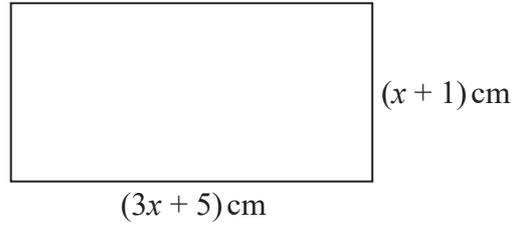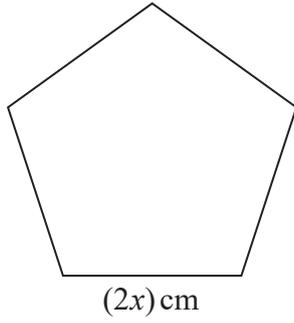
Find the area of the rectangle.

.... cm²

(Total for Question 32 is 4 marks)

33 A bag contains 10 coloured beads.

Two are red, two are blue, two are yellow, two are green and two are white.

A student takes two beads out of the bag at random.

What is the probability that the two beads he takes are the same colour?

....

(Total for Question 33 is 4 marks)

TOTAL FOR SECTION B IS 65 MARKS
TOTAL FOR PAPER IS 80 MARKS