MOUNT CARMEL INTERNATIONAL SCHOOL, AKOLA

Cambridge International

TERM END EXAM: II Subject: Mathematics Date: 10.04.2024

Student's Name: _____ Roll No. _____ Grade: 8

Marks: 80 Time: 120 minutes Invigilator's Sign.

1. Ice creams cost $1.10 each. Ice pops cost $0.90 each. Saavi spends $60 buying *c* ice creams and *p* ice pops for her party. Write a function to represent this situation. (1)

_____

2. Coach seats 15 students and a bus seats 45 students. 360 students travel by coach or bus every morning to go to school. Every coach and bus is full. Tick the correct option/options. (2)

The situation is modelled by the function 15x+45y=360. Which of these statements are true?

a. x = the number of students that travel in one coach.

b. y = the number of buses used in the morning.

c. x = the number of coaches used in the morning.

d. y = the number of students that travel in one bus.

3. Baker gets a supply of 120 kg of flour each day. He uses all of this flour every day by baking some small loaves of bread and some large loaves of bread. A small loaf uses 400 grams of flour, a large loaf uses 800 grams of flour. (2)

a. He forms the function 400x + 800y=120 to represent this situation. Write down what mistakes the baker has made in forming this function.

_____

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b. Form a correct function to describe this situation.

_____

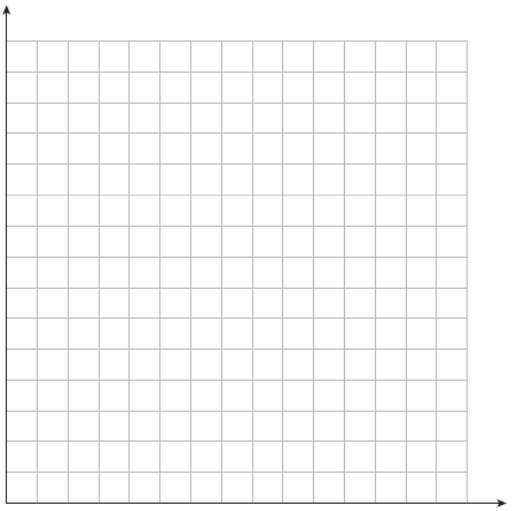
4. An electric car travels 6 km for each unit of electricity it uses.

a. Copy and complete the table to show the distance travelled, d kilometres, using u units of electricity. **(1)**

u	0	1	2	3	4
d				18	

b. Draw a graph to show the relationship between d (on the y axis) and u (on the x axis).

Use your graph to find the distance the car travels when it uses 1.5 units of electricity. **(2)**



c. Write a formula for the distance travelled (d km) using u units of electricity. **(1)**

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5. a. Write the equation of the line in the form $y = mx + c$. **(1)**

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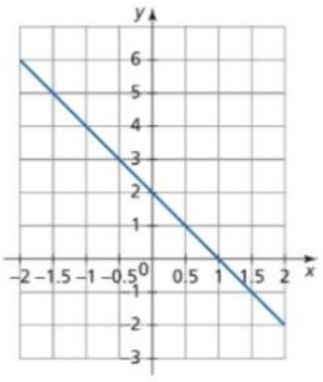

b. Find the gradient of the line. **(1)**

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6. Write this equation in the form $y = mx + c$ by making y the subject and then find the gradient and y-intercept. **(2)**

$$2x - \frac{1}{2}y = 3$$

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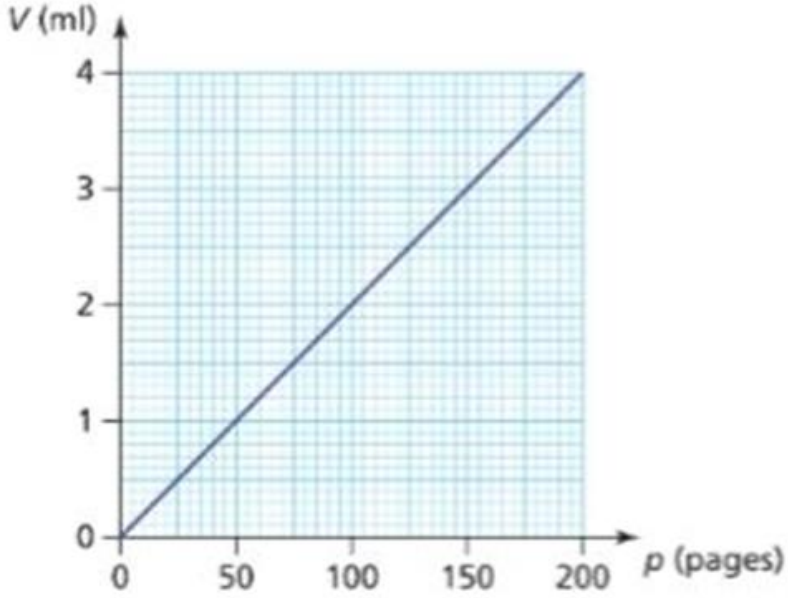
7. The graph shows the volume of black ink, *v* millilitres, used by a home printer to print *p* pages of text.



a. Use the graph :

i. to find the volume of ink used to print 60 pages. **(1)**

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ii. to find the number of pages that can be printed with 3.4 ml of ink. **(1)**

_____

b. One black ink cartridge costs $25 and contains 4 ml of ink. Find the cost of ink used to print 40 pages. **(1)**

_____

8. A bag contains only red, yellow and green badges. A badge is chosen at random. The probability that the badge chosen is red is 0.22. The probability that the badge chosen is yellow is twice the probability that it is red. (2)

a. What is the probability that the badge chosen is yellow?

_____

b. What is the probability that the badge chosen is not green?

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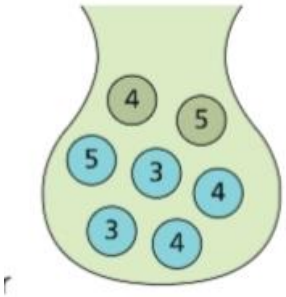
9. Max takes a counter at random from this bag.

He puts the counter back in the bag. Then takes second counter at random.



a. Decide if the colour of the first counter is independent of the colour of the second counter. Give a reason. **(1)**

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b. Find the probability that on both picks he takes a counter with the number 4. **(1)**

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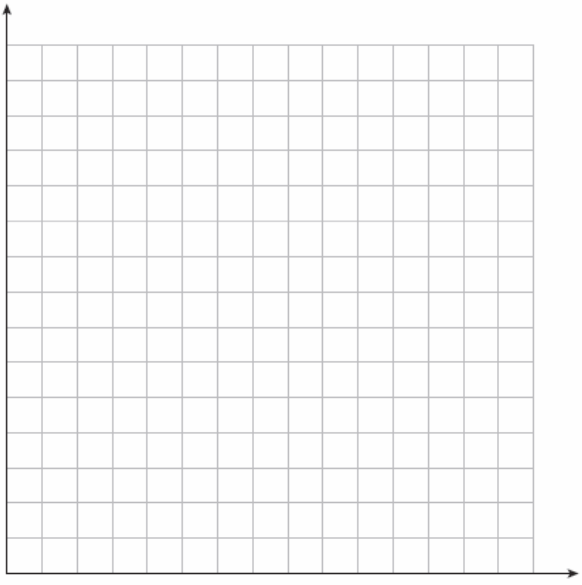
10. Ferro is rolling a six-sided dice. He records the number of times it lands on a 6 after every 20 rolls and calculates the relative frequencies.

His results are shown in the table.

Frequency	4	16	22	27	32
Number of rolls	20	40	60	80	100
Relative frequency					

a. Calculate the relative frequencies after each 20 rolls and complete the table. Give your answers correct to two decimal places. You can use the given box for calculations. **(2)**

b. Plot the relative frequencies on a graph. **(1)**



c. Ferro says the dice is biased. Do you agree? Give a reason for your answer. **(1)**

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d. Ferro rolls the dice a total of 600 times. If the dice was fair, find the expected frequency of it landing on a 6. **(1)**

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11. Lottie buys a drink and a biscuit from a café.

The probability she buys a hot drink is 0.55 The probability she buys a chocolate biscuit is 0.8

a. Calculate the probability that she buys a hot drink and a chocolate biscuit. **(1)**

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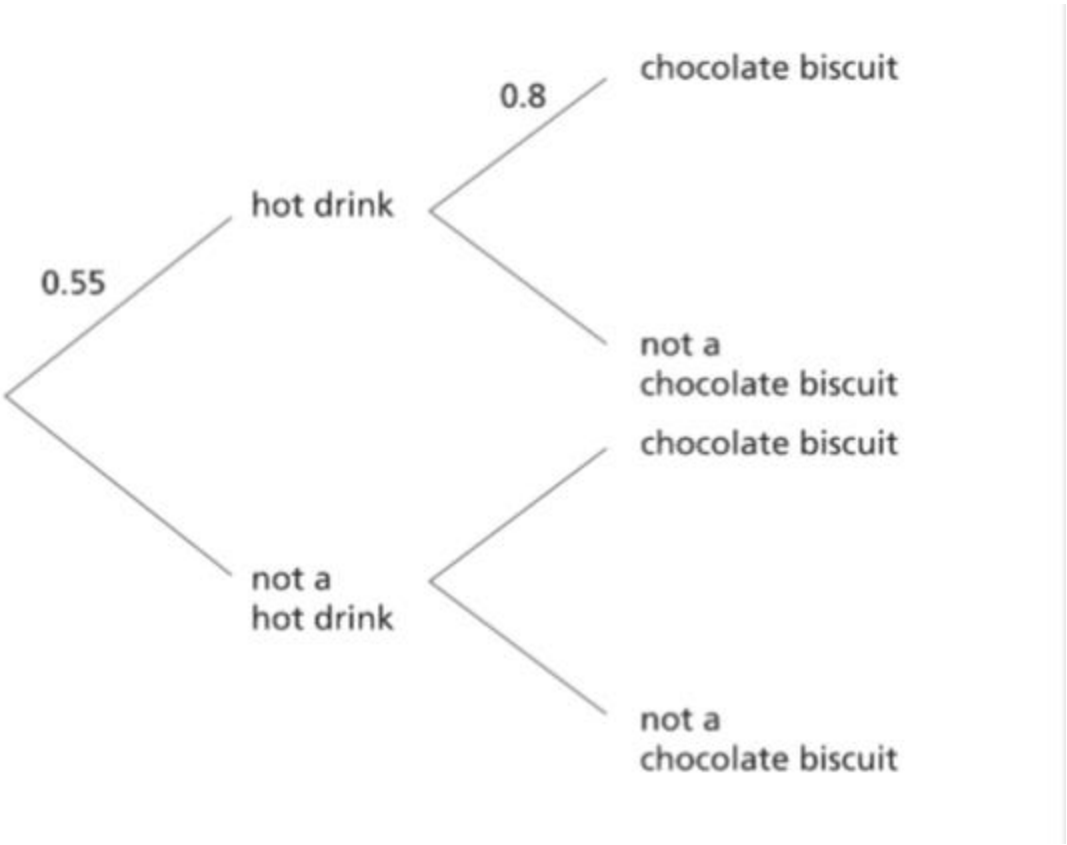
b. Complete the tree diagram by writing in all the probabilities. **(2)**



12. A rectangle has a perimeter of 8 cm and an area of 3 cm².

a. The rectangle is enlarged with a scale factor of 4. Find the perimeter of the enlarged rectangle. **(1)**

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b. The rectangle is enlarged with a scale factor of 5. Find the area of the enlarged rectangle. **(1)**

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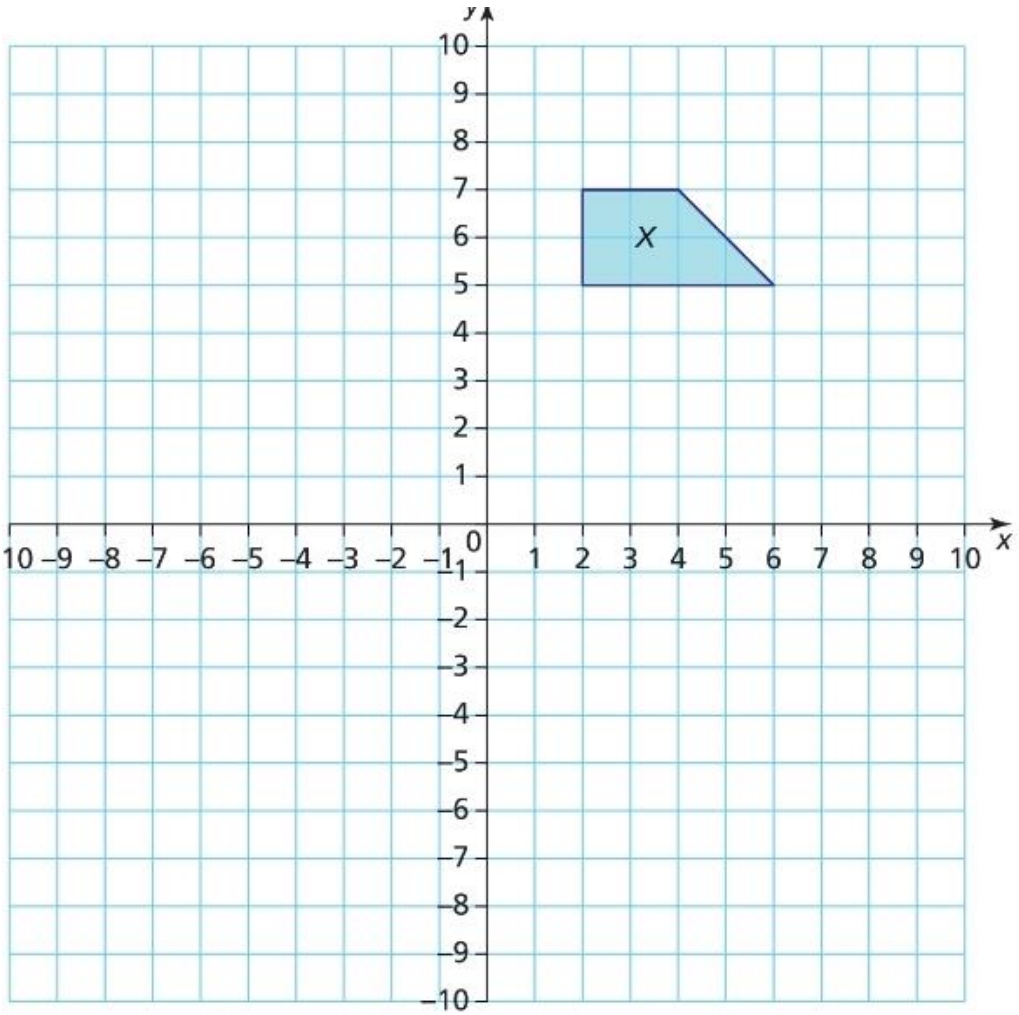
13.



a. Reflect X in the line y = 4. Label the image X1. **(1)**

b. Rotate X1 through 90° clockwise about the point (2, 3). Label the image M. **(1)**

c. Translate M with vector $\begin{pmatrix} -2 \\ 2 \end{pmatrix}$ Label the image N. **(1)**

d. Describe mathematically the single transformation which takes X to N. **(2)**

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e. Is **X** congruent to **N**? Explain. **(1)**

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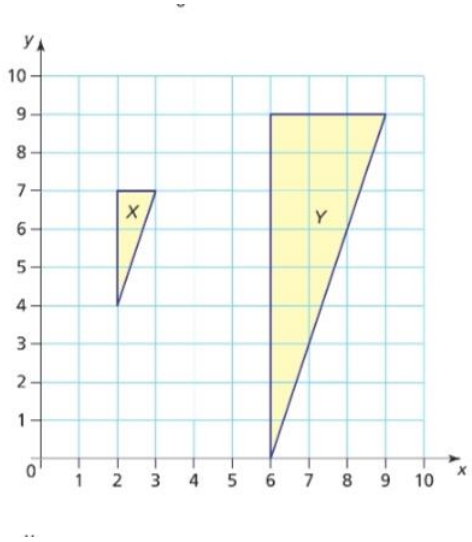
14. Shape X is enlarged to shape Y Describe the enlargement. **(2)**



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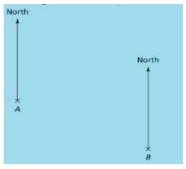
15. The diagram shows the position of two mountain tops, A and B

B is 8 km from **A** on a bearing of 120. (Image is given for reference)

A third mountain **C** is on a bearing of 140" from **A** and on a bearing of 270" from **B**.

a. Use a scale of 1: 200 000 to make a scale drawing of the diagram. **(3)**

b. Mark the position of the mountain top C on the scale drawing. **(1)**



c. Find the distance between B and C in real life. **(1)**

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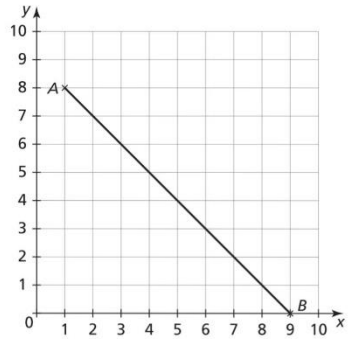
16. Write down the coordinates of the point: **(1)**

$\frac{1}{4}$ of the way along AB from point A



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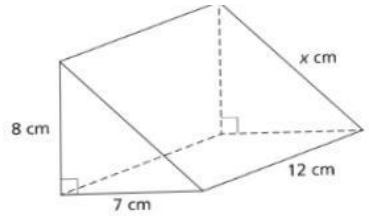
17. Here is a triangular prism.



a. Use Pythagoras' theorem to calculate the value of x. Give your answer to 2 decimal places. **(1)**

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b. Calculate the surface area of this prism. Give your answer to 1 decimal place. **(2)**

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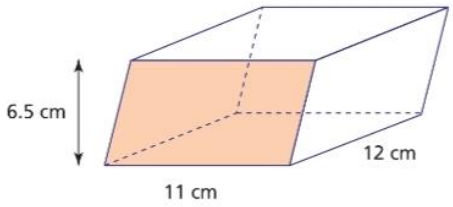
18. Calculate the volume of the given shape. **(2)**



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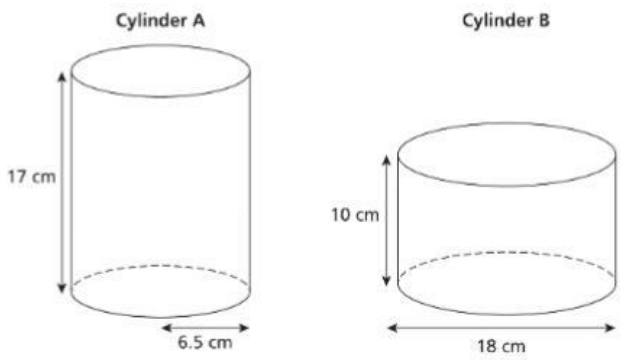
19. Here are two cylinders.



a. Which of these cylinders has the larger surface area? Show how worked out your answer. **(2)**

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_____

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b. Calculate the volume of Cylinder B. **(2)**

_____

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20. A prism has a cross section that is an equilateral triangle.

a. How many planes of symmetry does this prism have? **(1)**

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b. Draw the planes of symmetry. **(2)**

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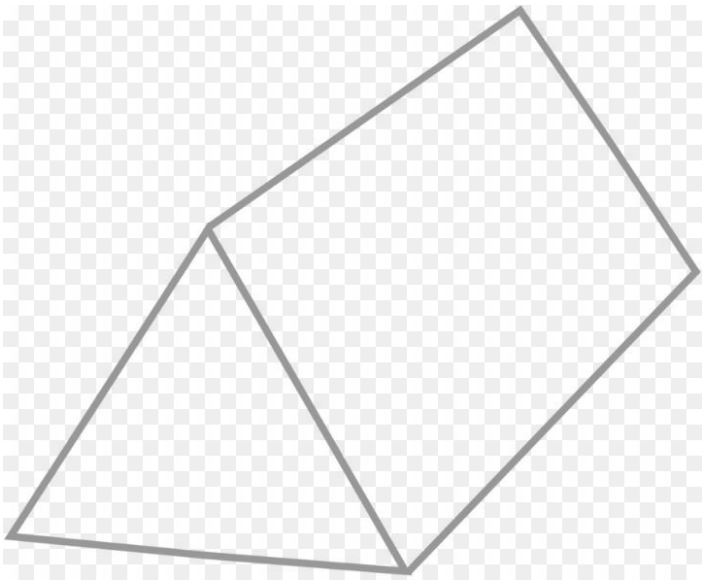

21. Klaus measures the lengths of some cut flowers delivered to his shop. He creates this frequency table to show the results. Calculate an estimate of the mean length of flower. **(1)**

Length, l (cm)	Frequency
$15 \leq l < 20$	1
$20 \leq l < 25$	8
$25 \leq l < 30$	24
$30 \leq l < 35$	16
$35 \leq l < 40$	3

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22. Clare wants to compare how many times men and women have read a newspaper in the past month. She draws this back-to-back stem-and-leaf diagram to show the number of newspapers read by a sample of 15 men and 15 women.

Women		Men
9 6 4 3 0	0	0 0 1 2 7
8 7 5 3 1 0	1	3 6
7 6 4 2	2	0 0 1 6
	3	0 0 1 1

Key 0 | 1 = 10 newspapers Key 1 | 3 = 13 newspapers

a. Calculate the median and range for the number of newspapers read by men. **(2)**

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_____

_____

The median number of newspapers read by the women is 13. The range for the number of newspapers read by the women is 27.

b. Compare the number of newspapers read by men and women through a short explanation. **(1)**

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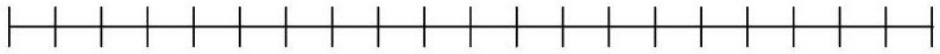
23. Solve the inequalities and show your answer on a number line. **(2)**

$$21 - 3x < 3$$



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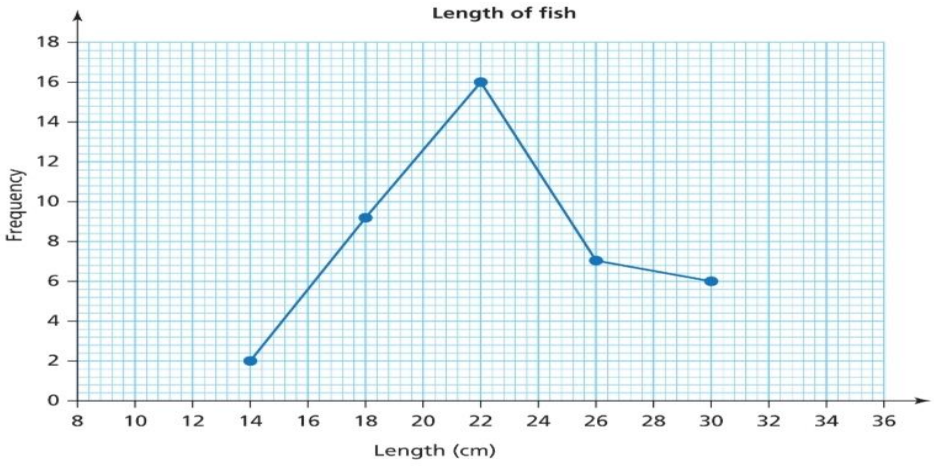
24. The frequency polygon shows the length of a sample of fish caught in a lake during a competition.



a. Copy and complete the table. The first row has been done for you. **(2)**

Length, l (cm)	Midpoint	Frequency
$12 \leq l < 16$	14	2

b. Find how many fish were in the sample. **(1)**

_____

c. Find the percentage of the sample that were less than 20 cm in length **(1)**

_____

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25. The scatter graph shows the arm length and the height of some students.

a. Describe the correlation between height and arm length. **(1)**

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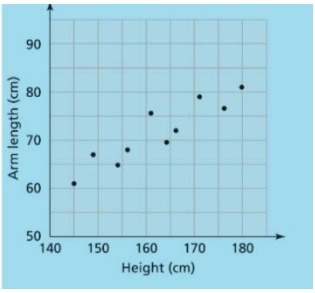

b. A different student is 158 cm tall. Use your graph to estimate the student's arm length. **(1)**

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26. The frequency diagram shows the speeds of a sample of vehicles travelling on a road **(1)**

a. Write down the modal class.

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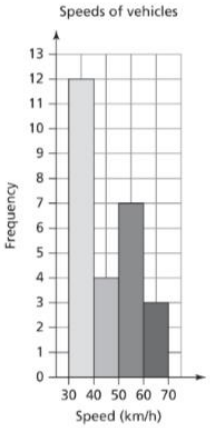

b. Write down the class interval that contains the median.

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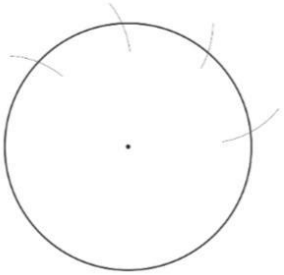
27. Fenny is trying to inscribe a regular hexagon inside a circle. This is the start of construction. What mistake has she made? **(1)**



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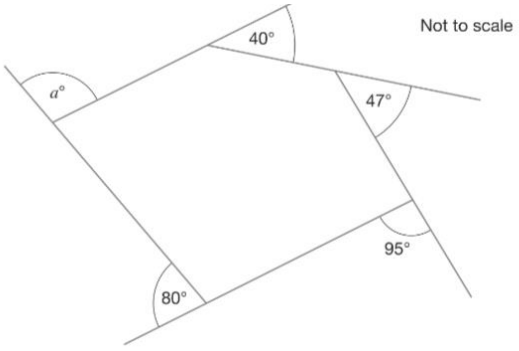
28. The diagram shows angles of a pentagon. Write the value of a **(1)**



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29. a. The first term of a sequence is 3. The term-to-term rule is 'square and subtract 1". Find the third term of the sequence. **(1)**

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b. Write down the next two terms of the sequence 6, 8, 13, 21 ... Also write the nth term rule for the same. **(1)**

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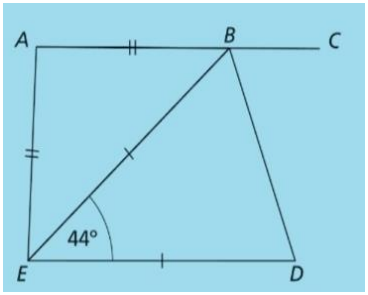
30. ABE is an isosceles triangle with AB = AE. **(2)**
BDE is an isosceles triangle with BE = DE.
ABC and ED are parallel lines.
Angle BED = 44”
Find angle EAB



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31. Calculate the sum of the interior angles of a nonagon. **(1)**

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32. Yuri wants to find out how students in his school feel about homework.
He designs a questionnaire and gives it to some of the people in his year. His questionnaire contains the following question:
“Don't you agree that we get too much homework?”
Write down the possible sources of bias in Yuri's investigation. **(2)**

_____

_____

_____

32. Ruby buys three T-shirts and two pairs of sandals for $31. Donna buys four T-shirts and three pairs of sandals for $44. **(2)**

a. Write a pair of simultaneous equations to show what they bought.

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b. Solve the simultaneous equations.

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