



Province of the
EASTERN CAPE
EDUCATION

SENIOR PHASE

GRADE 9

JUNE 2011

MATHEMATICS

MARKS: 100

TIME: 2 hours

This question paper consists of 13 pages, and 3 diagram sheets.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of 7 questions. Answer ALL the questions.
2. Write neatly and legibly.
3. Use the same numbering system as on the question paper.
4. Show all your calculations, where necessary.
5. A non-programmable calculator may be used.

If necessary, answers should be rounded off to TWO decimal places, unless stated otherwise.

6. Diagrams are NOT necessarily drawn to scale.
7. THREE diagram sheets (ANNEXURES) are attached at the end of this question paper namely: ANNEXURE A (QUESTION 2.4), ANNEXURE B (QUESTION 4.1) and ANNEXURE C (QUESTION 7.4.1). Write your NAME in the spaces provided and hand them in together with your ANSWERBOOK.

SECTION A

In this **section**, there are 22 multiple choice questions. For each question, **four** possible answers are given. **Only one** answer is correct. Write the number, then select the letter for the correct answer and write it next to the corresponding number. Please do not rewrite the question.

EXAMPLE:

1.21 In scientific notation 456 000 is:

- A $45,6 \times 10^5$
- B 456×10^{-5}
- C $4,56 \times 10^5$
- D 456×10^5

The correct answer is $4,56 \times 10^5$, which is letter C.

ANSWER : 1.21 C

1. The number 2000 can be written in exponent form as:

- A $(2 \times 3)^3$
- B $2^3 \times 5^3$
- C $3^2 \times 5^4$
- D $2^4 \times 5^3$

(1)

2. Look at the following sequence of numbers: 3; 9; 15; 21; 27; 33; 39; ...
Which of the following numbers is in the sequence?

- A 222
- B 246
- C 219
- D 400

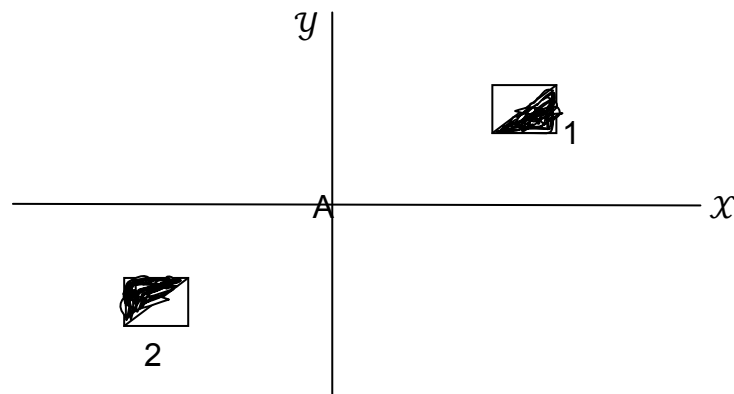
(1)

3. 5 seconds as a fraction of 2 minutes is ...

- A $2\frac{1}{2}$
- B $\frac{2}{5}$
- C $\frac{1}{24}$
- D $\frac{1}{42}$

(1)

4. The rotation needed to move square 1 to square 2 about point A is:

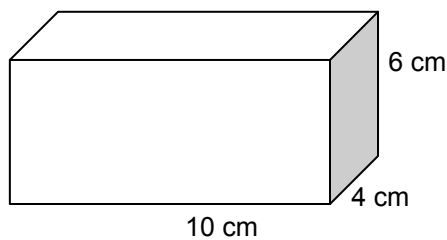


- A 120° clockwise
 B 120° anti-clockwise
 C 180° anti-clockwise
 D 90° clockwise

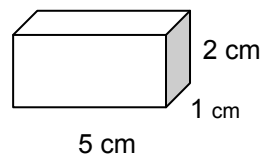
(1)

5. How many boxes identical to Box B will fill Box A exactly?

Box A



Box B



- A 24
 B 10
 C 12
 D 18

(1)

6. 29 in Roman numerals / figures is:

- A XXIX
 B XIXX
 C XXXI
 D IXXX

(1)

7. Which of the following numbers is not a rational number?

- A 3,18
 B 2,5
 C $\sqrt{5}$
 D $\sqrt[3]{27}$

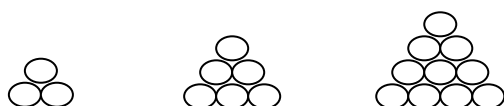
(1)

8. $\left(\frac{3^3}{3^2 \cdot 3}\right)^2$ can be written in the simplest form as:

A 3^{-1}
 B 1
 C 3
 D 0

(1)

9. Peter and Zanele are playing with marbles by arranging them as shown below. How many marbles will they need to build the next pattern?



A 12
 B 15
 C 18
 D 21

(1)

10. The factors of $(a + b)x + (a + b)y$ are :

A $(a + b)(x + y)$
 B $(a + b)^2(x + y)$
 C $(ax + bx)(ay + by)$
 D $(a + y)(b + x)$

(1)

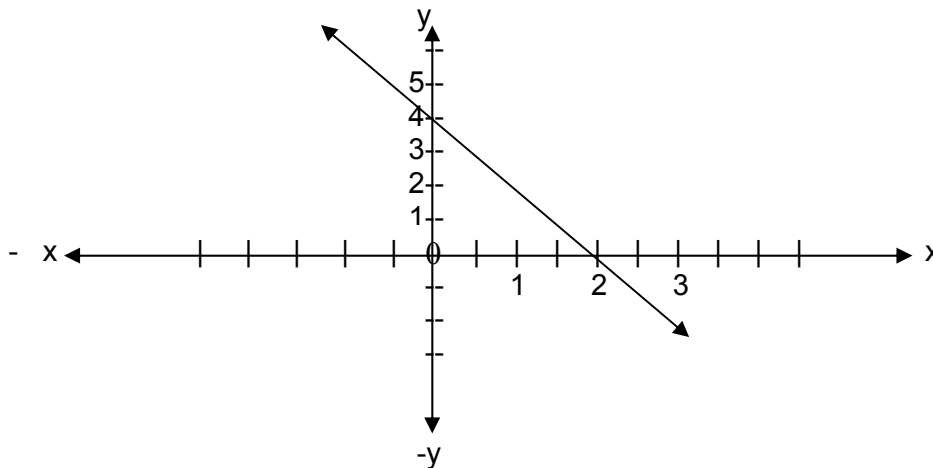
11. Study the table below and choose the correct output value represented by **p** and input value represented by **q**.

INPUT	1	2	3	15	21	q
OUTPUT	5	8	11	p	65	209

A $p = 14$; $q = 22$
 B $p = 62$; $q = 22$
 C $p = 30$; $q = 70$
 D $p = 47$; $q = 69$

(2)

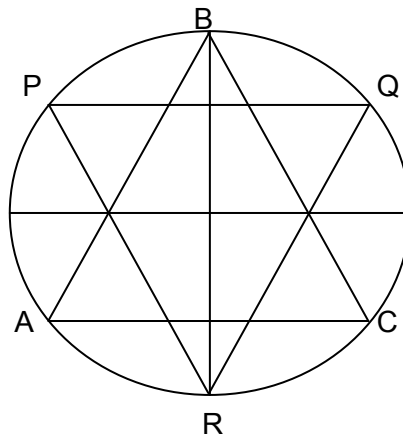
12. The equation for this line graph is:



- A $y = -2x + 4$
- B $y = 2x + 4$
- C $y = -4x + 2$
- D $y = 4x + 2$

(1)

13. In the star, $\angle A + \angle B + \angle C + \angle P + \angle Q + \angle R =$
(Hint: $\triangle ABC$ and $\triangle PQR$ are equilateral triangles.)



- A 720°
- B 540°
- C 360°
- D 300°

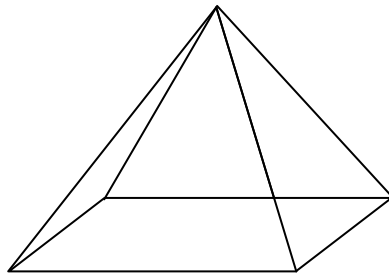
(1)

14. Which of the statements below is not a property of quadrilaterals?

- A Two pairs of opposite sides equal in length and parallel.
- B All the sides have a common vertex.
- C One pair of opposite sides parallel.
- D Two pairs of adjacent sides are equal in length.

(1)

15. The pyramid below has:



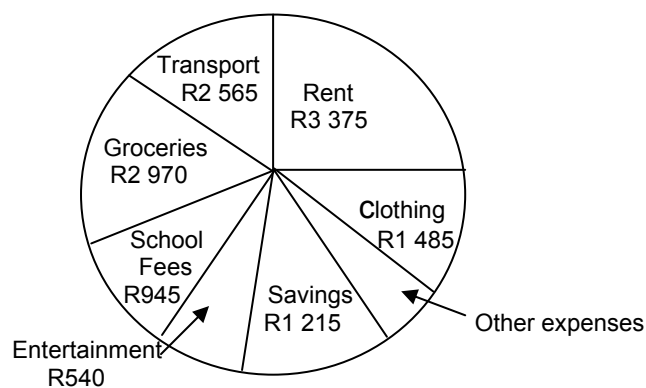
- A 5 faces, 5 vertices and 8 edges
 B 4 faces, 4 vertices and 4 edges
 C 3 faces, 5 vertices and 5 edges
 D 2 faces, 4 vertices and 3 edges (1)
16. One of the following developments in Mathematics below was proved by Pythagoras, a Greek philosopher:
- A In a right angled triangle, the square on the hypotenuse is equal to the sum of the squares of the other two sides.
 B In any triangle, the exterior angle is equal to the sum of the two opposite interior angles.
 C In any triangle, the sum of its interior angles is equal to 180° .
 D In two similar triangles, the ratios of the corresponding sides are equal. (1)
17. Which of the following is not a Pythagorean triple?
- A (2; 3; 4)
 B (3; 4; 5)
 C (5; 12; 13)
 D (6; 8; 10) (1)
18. In Cape Town a survey on the means of transport used by 2 million people gave the following result.
- | Means of Transport | Public Buses | Trains | Local Taxis | Luxury Coaches | Tour Operators | Private Group | Bicycles |
|--------------------|--------------|--------|-------------|----------------|----------------|---------------|----------|
| Percentages | 4% | 3% | 5% | 30% | 15% | 20% | 23% |
- The number of people using Private Group is ...
- A 200 000
 B 40 000
 C 400 000
 D 20 000 (1)
19. Which of the following statements is correct?
- A Mean is the middle value in a set of data, after the data has been arranged.
 B Mode is the value that occurs most frequently in a set of data.
 C Range is the sum of values divided by the number of values in a set of data.
 D Median is the difference between the highest value and the lowest value in a set of data. (1)

20. In a deck of 52 cards, the probability of selecting a black card is:

- A $\frac{1}{13}$
 B $\frac{1}{2}$
 C $\frac{1}{4}$
 D $\frac{1}{52}$

(1)

21. Mr Zwelakhe earns a net salary of R13 500. Shown in the pie chart is his monthly expense. What amount does he spend on *Other expenses*?



- A R450
 B R405
 C R540
 D R400

(1)

22. Two dice are thrown. All the possibilities are represented in a two table below. The chances of getting the same number on both dice are ...

Dice 2

Dice 1		1	2	3	4	5	6
	1	1;1	1;2	1;3	1;4	1;5	1;6
	2	2;1	2;2	2;3	2;4	2;5	2;6
	3	3;1	3;2	3;3	3;4	3;5	3;6
	4	4;1	4;2	4;3	4;4	4;5	4;6
	5	5;1	5;2	5;3	5;4	5;5	5;6
	6	6;1	6;2	6;3	6;4	6;5	6;6

- A $\frac{7}{36}$
 B $\frac{5}{36}$
 C $\frac{1}{6}$
 D $\frac{6}{6}$

(1)

SECTION B

QUESTION 1

1. Look at the list of numbers below and then answer the questions that follow.

$$\sqrt{25}; 2,3; \pi; \sqrt[3]{19}; 4\frac{3}{7}; 16$$

- 1.1 Which numbers from the list are?

1.1.1 Rational numbers (1)

1.1.2 Irrational numbers (1)

- 1.2 What set of numbers is formed when rational numbers are put together with irrational numbers? (1)

- 1.3 Convert $5,629 \times 10^{-3}$ to a decimal form without using scientific notation. (1)

- 1.4 Simplify: $\frac{(2a^2b^4)^3 \times 4ab^3}{8a^{-2}b^7}$ (3)

- 1.5 The Bamboo family is going to visit the Pillay family in a town 480 km away. The journey normally takes about 4 hours. If they have travelled for 3 hours 20 minutes, how much distance are they still to travel to reach their destination? (3)

[10]

QUESTION 2

- 2.1 Simplify:

2.1.1 $\frac{a^2 - b^2}{y(a - b)} \times \frac{x(3a + 4b)}{9a^2 - 16b^2}$ (3)

2.1.2 $(5x - 1)(2x + 3)$ (2)

- 2.2 Factorise $p^3 - p^2r - 9p + 9r$ (3)

- 2.3 Solve for x in the equations below:

2.3.1 $6(x + 2) = 3(3x - 4) - 3$ (3)

2.3.2 $\frac{4x}{5} = \frac{(x - 7)}{3}$ (2)

2.3.3 $3.5^{x+1} = 75$ (3)

- 2.4 Draw the graph of $y = \frac{1}{2}x - 4$ by finding the intercepts with both the axis. (4)
(Use the diagram sheet provided in ANNEXURE A.)

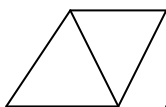
[20]

QUESTION 3

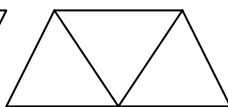
- 3.1 Mrs Memka, a Mathematics educator likes building blocks with matchsticks. Her learners have taken an interest in their educator's hobby and they started working with sticks doing a lot of combinations. The structures below are some of the combinations they built.



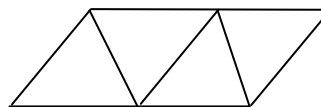
Structure 1



Structure 2



Structure 3



Structure 4

Mrs Memka asked her learners to summarise what they have discovered by doing the following:

Draw the next structure.

(1)

- 3.2 The table below is the representation of the structures above.

Number of triangles	1	2	3	4		n
Number of matchsticks	3	5	7	9	25	

- 3.2.1 How many triangles can be formed using 25 matchsticks?

(2)

- 3.2.2 Find the general rule for any n triangles.

(2)

- 3.2.3 Use the pattern to find out the number of matchsticks that the learners would need to build 40 triangles.

(1)

- 3.3 Thami is 12 years older than Linda. The sum of their ages is 82. Calculate

- 3.3.1 Linda's age

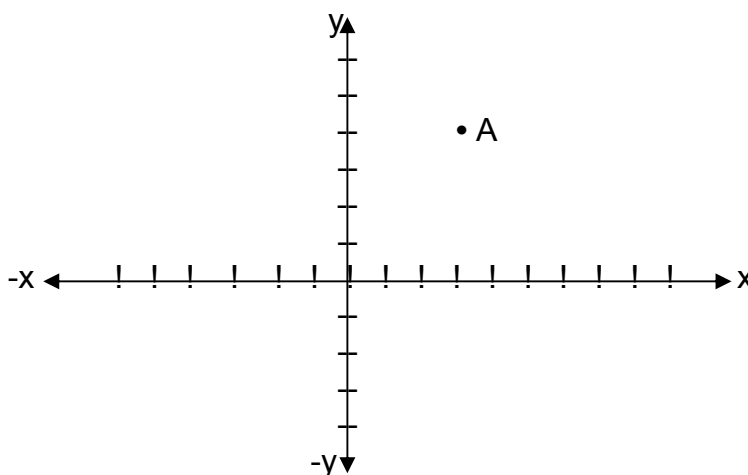
(2)

- 3.3.2 Thami's age

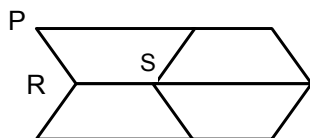
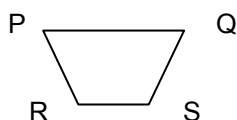
(1)

[9]**QUESTION 4**

Study the graph below. Use ANNEXURE B to answer the following questions:



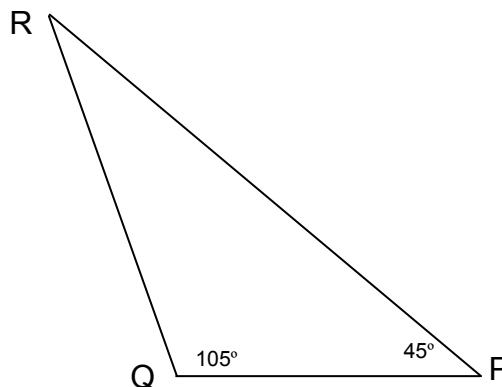
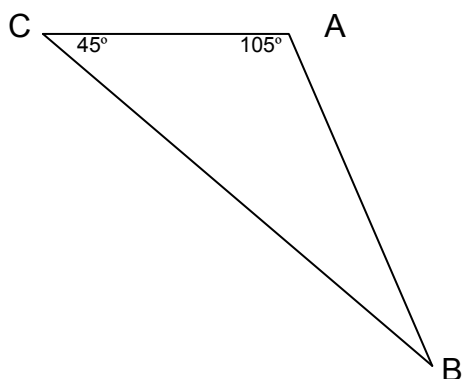
- 4.1 From the point A move 4 units to the left (name the point B). From point B move 3 units down (name this point C).
NB: Use arrows to show the directions of your movement.
Show clearly on the graph the position of point C. (1)
- 4.2 Write down the co-ordinates of point C. (1)
- 4.3 What kind of transformation is used to move from point A to point B? (1)
- 4.4



- 4.4.1 What type of a quadrilateral is PQRS? (1)
- 4.4.2. Give an explanation why the shape above tessellates. (2)

[6]**QUESTION 5**

- 5.1 Study and compare the triangles below and then complete the following.



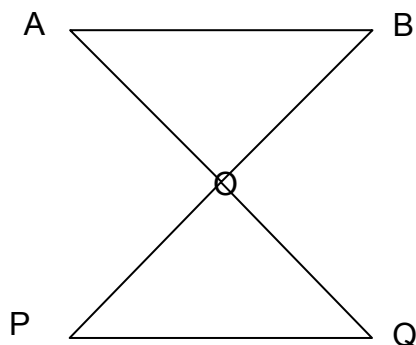
- 5.1.1 $\angle B = \angle \dots\dots\dots$ in $\triangle RPQ$ (1)
- 5.1.2 Therefore $\triangle ABC$ is to $\triangle QRP$. (1)
- 5.1.3 Give a reason for your claim in QUESTION 5.1.2. (1)

Complete the following.

$$5.1.4 \quad \frac{AC}{QP} = \frac{AB}{?} \quad (1)$$

$$5.1.5 \quad \frac{AC}{QP} = \frac{BC}{?} \quad (1)$$

5.2 Study the figure below if $AB \parallel PQ$ and $AB = PQ$.



5.2.1 Prove that $\triangle ABO \equiv \triangle PQO$ (4)

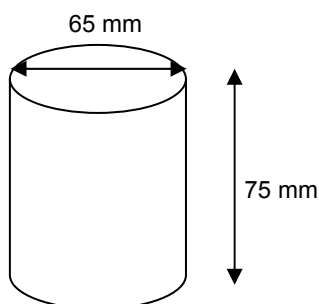
5.2.2 State any other condition/axiom for congruency. (1)
[10]

QUESTION 6

6.1 A cooldrink can measures 65 mm in diameter and 75 mm in height.

Hint: $\pi = \frac{22}{7}$; Volume of a cylinder = $\pi r^2 h$

6.1.1 Calculate the volume of the can. Convert your answer to cm^3 . (4)



6.1.2 The can contains 200 ml of liquid. How much air space is there in the can? (2)

[6]

QUESTION 7

The following are the marks obtained by 20 learners in a Mathematics test out 50 marks.

40	45	19	16	42
34	23	26	38	18
30	41	39	29	33
27	24	37	35	49

7.1 Design a stem and leaf diagram to group the data mentioned above. (4)

7.2 Copy and complete the table below, by using the same data.

Interval	Tally	Frequency
0 – 9		
10 – 19		
20 – 29		
30 – 39		
40 – 49		
		Total:

(2)

7.3 Work out the following from the data above:

7.3.1 Average mark (2)

7.3.2 Median (1)

7.3.3 Mode (1)

7.3.4 Range (1)

7.4 A thermometer was put in a science laboratory. The temperature taken every two hours for one day were recorded as shown in the table provided below.

Time	02:00	04:00	06:00	08:00	10:00	12:00	14:00	16:00	18:00	20:00	22:00	24:00
Temperature in °C	10°C	9°C	8°C	13°C	23°C	26°C	28°C	30°C	28°C	26°C	19°C	14°C

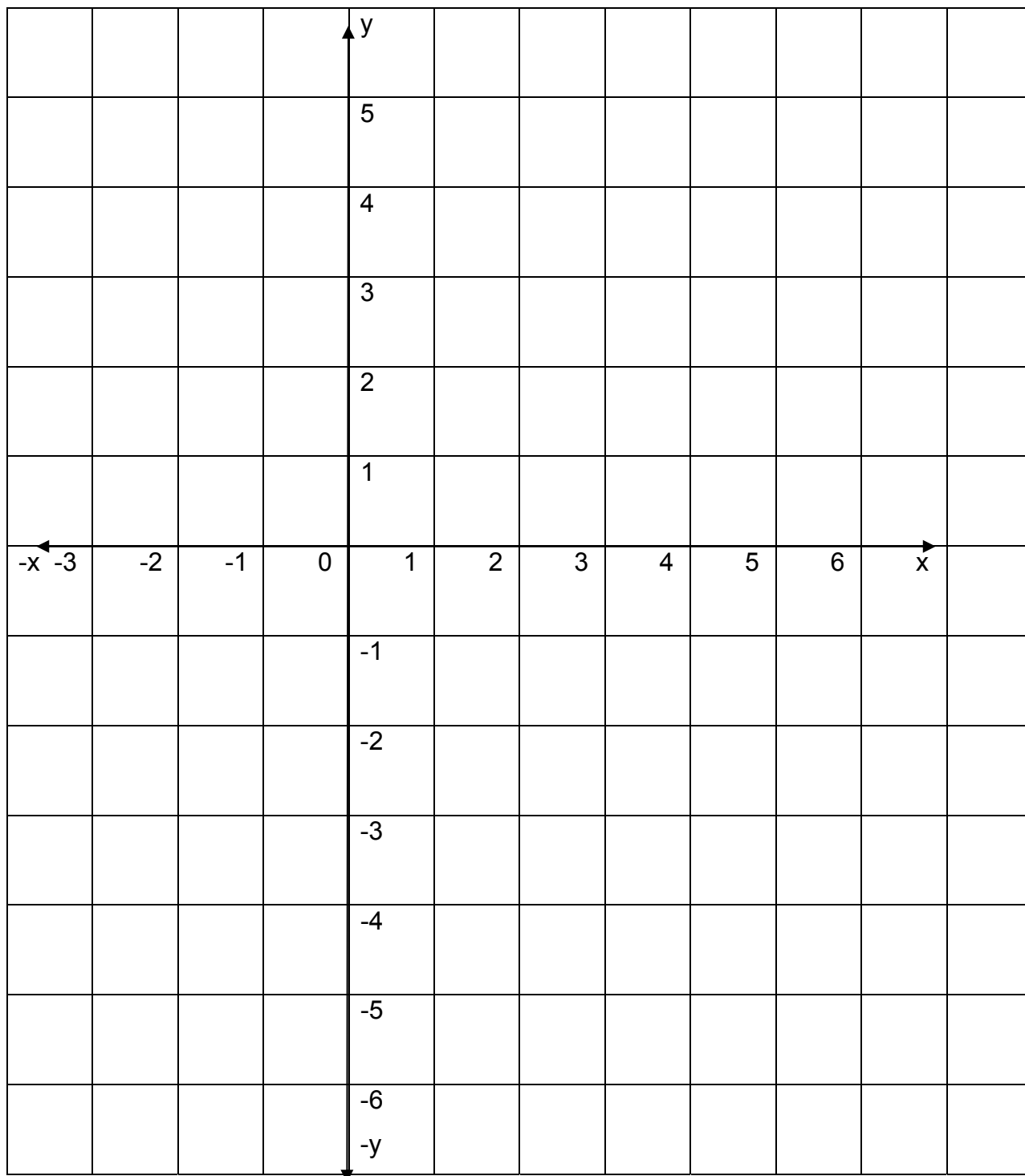
7.4.1 Use ANNEXURE C to draw a bar graph of the results. (4)

7.4.2 What is the warmest hour of that day and at what temperature? (1)

[16]**TOTAL SECTION B: 77****GRAND TOTAL: 100**

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QUESTION 2.4



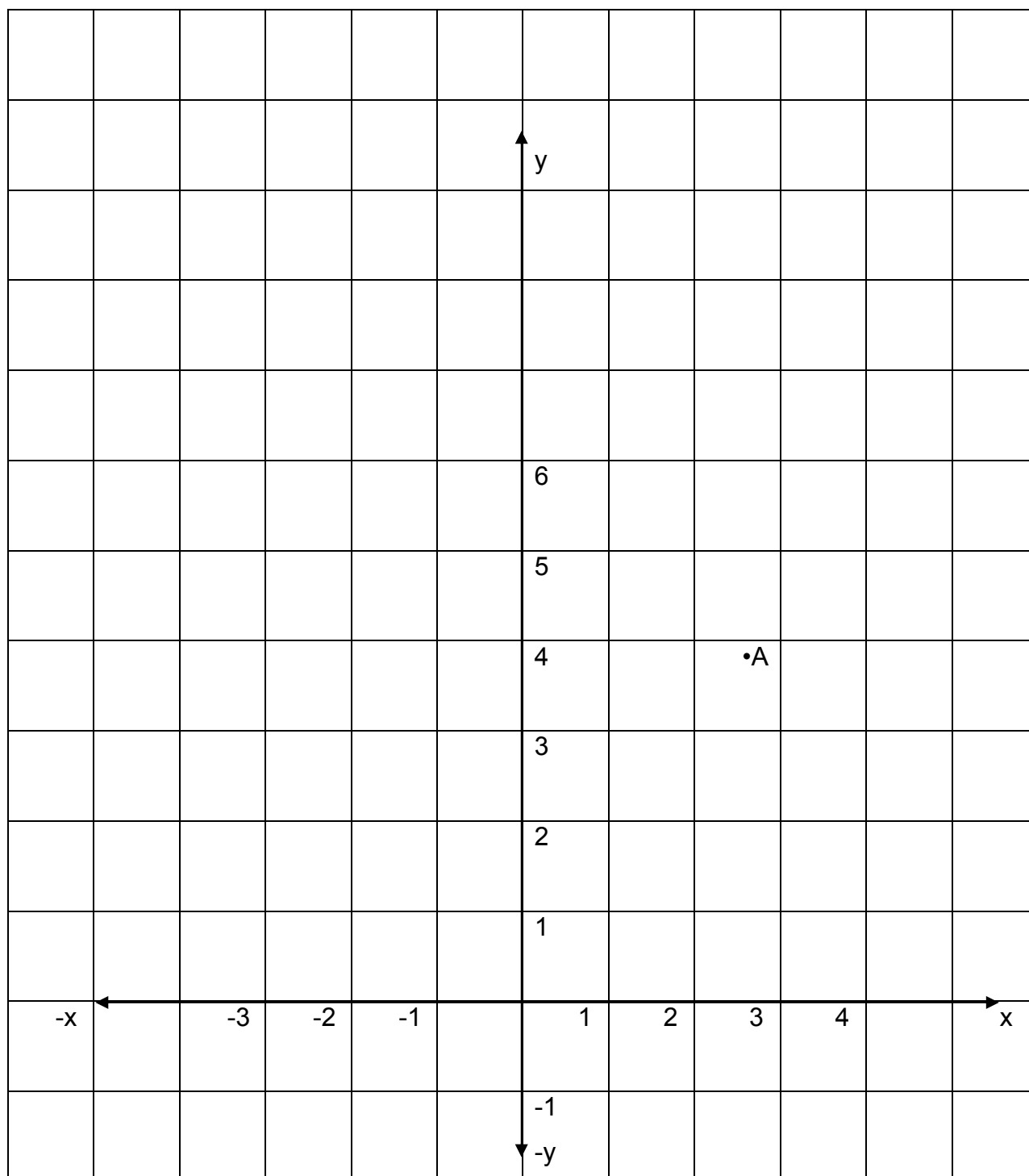
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QUESTION 4

ANNEXURE B

QUESTION 4.1



NAME:

DIAGRAM SHEET

QUESTION 7

ANNEXURE C

QUESTION 7.4.1

