GRADE 9 MATHEMATICS

Content for final exams

NOVEMBER 2026

[75 marks]	PAPER ONE (GEC) Government Issued	2,5 hours

	TOPICS	CLASSROOM MATHEMATICS
Number, Operations & Relations	• Whole Numbers • Integers • Exponents • Fractions • Decimals • Number Patterns • Finance • Ratio, Rate & Proportion	Chapters: 1-6
Functions & Algebra	• Functions/Graphs & Relations(Straight line) • Algebraic Expressions • Algebraic Equations	Chapters: 7-9; 17-20

[75 marks]	PAPER TWO(GEC) Government Issued	2,5 hours

	TOPICS	CLASSROOM MATHEMATICS
Space & Shape Geometry	• Straight Line Geometry, 2D Geometry • Transformation Geometry	Chapters: 12;13;23
Measurement	• Pythagoras, Area, Perimeter, Volume & Total Surface Area, Capacity	Chapters: 14;15;21;24
Data Handling	• Data Handling • Probability	Chapter: 25; 26

ADDITIONAL INFORMATION

- There are many practice questions in your **PYTHAGORAS** book.
- **No constructions** of geometric figures will be examined.
- All assessments are **weighted** according to the **following criteria:**
  - **Knowledge** (25% of the paper) - *"These require the basic skills, applying definitions, etc".*
  - **Routine Procedures** (45% of the paper) - *"These are similar to our classwork examples".*
  - **Complex Procedures** (20% of the paper) - *"These are more involved, longer question".*
  - **Problem Solving** (10%) - *"These require us to apply our skills in new ways".*

basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL ASSESSMENT
GENERAL EDUCATION CERTIFICATE (GEC)

2025 GRADE 9

Subject: MATHEMATICS

Paper: 1

Marks: 75

Duration: 2 hours 30 minutes

Excluding 15 minutes reading time.

This paper consists of 26 pages, excluding the cover page.

9MATHS1

Instructions to the learner:

1. You will receive 15 minutes reading time before you begin answering this paper.
2. Read all the instructions and questions carefully.
3. Answer all the questions in the answer booklet provided.
4. In Section A, do your calculations before choosing the correct option.
5. In Section B, show all the necessary calculations.
6. Non-programmable calculators may be used, unless otherwise stated.
7. Diagrams are not necessarily drawn to scale and all lines are regarded as straight lines, unless stated otherwise.

The paper starts on the next page.



Do not turn the page until you are told to do so.

SECTION A

1. Which of the following best describes $0,8$?

   A Integer
   B Natural number
   C Rational number
   D Irrational number (1)

2. What is the LCM of 18 and 60?

   A 6
   B 36
   C 180
   D 1 080 (1)

3. What is the HCF of 75, 105 and 1 125?

   A 15
   B 45
   C 30
   D 60 (1)

4. The ratio of Kaizer Chiefs fans to Orlando Pirates fans at a soccer match is 5:2.
   There are 77 000 fans at the soccer match.
   How many Kaizer Chiefs fans are present?

   A 22 000
   B 30 800
   C 33 000
   D 55 000 (1)

5. Car 1, travelling at 140 km/h, leaves Qheberha at 08:00 and drives to East London.
Car 2, travelling at 120 km/h, leaves East London at 08:00 and drives on the same road to Qheberha.
The distance between Qheberha and East London is 286 km.
How far will Car 2 travel to the point where the two cars meet each other?

A 132 km
B 143 km
C 154 km
D 520 km (1)

6. R7 750 is invested at 10% per annum compound interest for 24 months.
How much interest will the investment earn in 24 months?

A R1 627,50
B R9 377,50
C R9 300,00
D R1 550,00 (1)

7. $(-4 \times 7) \times 11$
Which expression represents the associative property?

A $(-4 \times 11) + (7 \times 11)$
B $(-4 \times 11) \times (7 \times 11)$
C $-4 \times (7 \times 11)$
D $-4 + (7 \times 11)$ (1)

8. What is the additive inverse of $3 - 4 - 7$?

A -8
B 8
C -6
D 6 (1)

9. Simplify: $12 - (6 - 10) + 18 - (-30) \times 2$

A 86
B 66
C 92
D 94 (1)

10. Evaluate: $\frac{4(-6) - (10) - 8(12 \div 16)}{-12 + 10}$

A -20
B -4
C 20
D 4 (1)

11. Evaluate: $-2^3 + 1^2 + \sqrt{49 \times 4} \div 7$

A -5
B -4
C 11
D 10 (1)

12. Simplify: $\frac{\sqrt[3]{-64}+5}{\sqrt{4^2+3^2}}$

A $\frac{1}{7}$

B $\frac{1}{5}$

C $\frac{9}{5}$

D $\frac{9}{7}$ (1)

13. Simplify: $6n^3 \div 3n^2$

A $2n$

B $2n^5$

C $18n$

D $18n^5$ (1)

14. Simplify: $\frac{(ab)^0 \times (a^3b)^{-2}}{(ab)^2}$

A $\frac{1}{a^8b^4}$

B $\frac{1}{a^{10}b^6}$

C $\frac{1}{a^7b^3}$

D $\frac{1}{a^6\ b^2}$ (1)

15. Evaluate: $\frac{3(m^{10}y)^0 \times y^5}{y^6} + \sqrt{25y^2} \times y^{-2} - \frac{(m^{-1}y)^3}{m^{-3}y^4}$

A $\frac{5}{y}$

B $\frac{4+3y}{y}$

C $\frac{2+5y}{y}$

D $\frac{7}{y}$ (1)

16. Given:

$\frac{1}{5}; \frac{3}{8}; \frac{9}{13}; \frac{27}{20}; \ldots$

What is the next term in the sequence?

A $\frac{23}{\cancel{8}}$

B $\frac{81}{\cancel{27}}$

C $\frac{8}{\cancel{23}}$

D $\frac{81}{\cancel{29}}$

(1)

17.

n	1	2	3		a
T_n	7	3	-1		-29

What is the value of a?

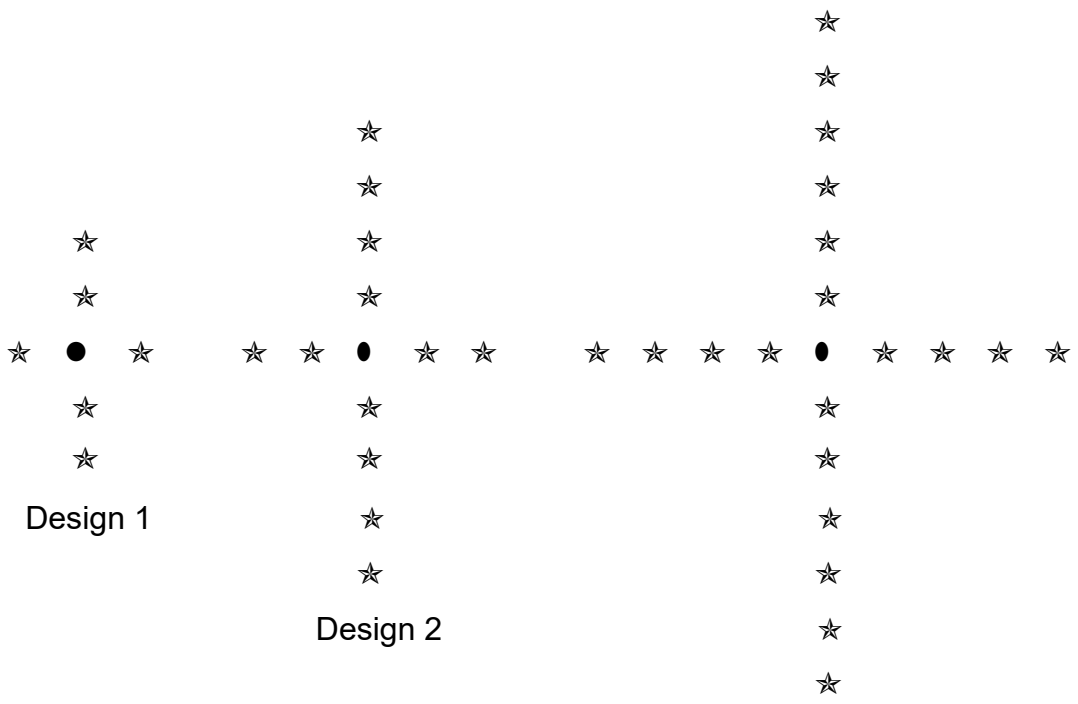
A -8

B 8

C -10

D 10 (1)

18.



Design 1 Design 2 Design 3

How many stars (☆) will there be in design 4?

A 30
B 32
C 33
D 36 (1)

19.

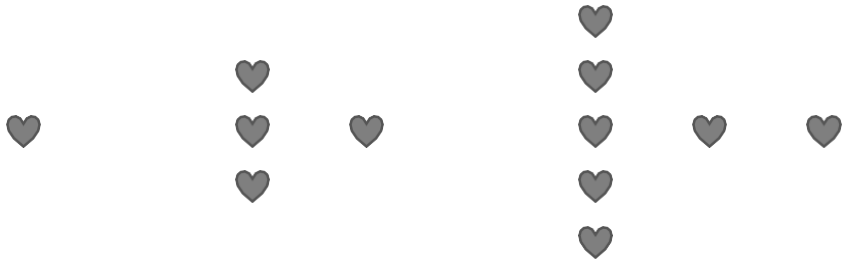


Figure 1 Figure 2 Figure 3

Which figure will have 73 hearts?

A 25
B 38
C 143
D 217 (1)

20. Given:

$\frac{1}{2}$; 2; $\frac{9}{2}$; 8; ...

Which statement best describes the rule of the pattern?

A Add a constant difference to the previous term.

B Multiply a constant ratio by the previous term.

C Every alternate term has an even numerator.

D The constant difference increases by 1 each time. (1)

21. Given: 1; 4; 9; 16; …

Which statement describes the rule?

A Each term is the cube of its position.

B Each term is the cube root of its position.

C Each term is the square of its position.

D Each term is the square root of its position. (1)

22. Given: 2; 5; 10; 17; …

What is the rule?

A $T_n = -3n + 5$

B $T_n = 3n - 1$

C $T_n = n^2 + 1$

D $T_n = n^3 + 1$ (1)

23. $5bac^2 + \frac{cab^2}{3} - 4ab^2c + acb^2$

How many like terms does the expression have?

A 0

B 2

C 3

D 4 (1)

24. $x(x^4) - \frac{x^3}{4} - \sqrt{x^8} + \frac{1}{3}$

Identify the numeric coefficient of x^4.

A 1

B $-\frac{1}{4}$

C -1

D $\frac{1}{3}$ (1)

25. Which of the following is a binomial?

A $2 \times x^2 + 5y$

B $2 \times x^2 \div 5y$

C $2 \times x^2 + 5 - y$

D $2 - x^2 + 5 - y$ (1)

26. Simplify: $-a(a - 3) - a^2$

A $2a^2 - 3a$

B $3a$

C $-2a^2 + 3a$

D $-3a$ (1)

27. Simplify: $\frac{x^3 + x^3}{\sqrt{16x^4}}$

A $\frac{1}{2}x^4$

B $\frac{1}{2}x$

C $\frac{1}{4}x$

D $\frac{1}{4}x^4$ (1)

28. Simplify: $(\sqrt[3]{-27a^6} - 2a^2)^3$

A $125a^6$

B $-125a^5$

C $125a^5$

D $-125a^6$ (1)

29. Simplify: $(3n - 5)^2$

A $9n^2 - 25$

B $9n^2 - 30n - 25$

C $9n^2 - 30n + 25$

D $9n^2 + 25$ (1)

30. $x + 2y = -2$.

What is the value of $(2y + x)^3$?

A 8

B -6

C 6

D -8 (1)

31. Factorise: $4m^2 - 9$

A $(2m + 3)(2m - 3)$

B $(2m - 3)(2m - 3)$

C $(4m - 3)(4m - 3)$

D $(4m + 3)(4m - 3)$ (1)

32. Factorise: $x^2 - \frac{3}{4}x + \frac{1}{8}$

A $(x - \frac{1}{2})(x - \frac{1}{4})$

B $(x + \frac{1}{2})(x - \frac{1}{4})$

C $(x - \frac{1}{2})(x + \frac{1}{4})$

D $(x + \frac{1}{2})(x + \frac{1}{4})$ (1)

33. Factorise completely: $4x^2 - 20x - 24$

A $4(x - 6)(x + 1)$

B $4(x + 6)(x - 1)$

C $4(x - 3)(x - 2)$

D $4(x + 3)(x - 2)$ (1)

34. Factorise completely: $x^2(x - 3) + 4(3 - x)$

A $(x - 3)(x^2 + 4)$

B $(x - 3)(x - 2)(x - 2)$

C $(3 - x)(x^2 + 4)$

D $(x - 3)(x + 2)(x - 2)$ (1)

35. Simplify: $(1-\frac{1}{a}) \div (a-\frac{1}{a})$

A $\frac{1}{a+1}$

B $\frac{1}{a-1}$

C $a+1$

D $a-1$ (1)

36. $\frac{2}{3}x = 12$

Solve for x.

A 6

B 18

C 8

D 11 (1)

37. $2x + 4 = x + 16$.

Mary and Sipho's ages are represented by the equation above.

Let Mary's age be x.

Which statement best describe the given equation?

A Sipho is twice as old as Mary. In 4 years' time he will be 12 years older than Mary.

B Sipho is half as old as Mary. In 4 years' time he will be 12 years older than Mary.

C Sipho is twice as old as Mary. In 4 years' time he will be 16 years older than Mary.

D Sipho is half as old as Mary. In 4 years' time he will be 16 years older than Mary. (1)

38. $3x - 2 = 4$

Solve for x.

A $x = 2$

B $x = 3$

C $x = -2$

D $x = -3$ (1)

39. $2^{x-1} = \frac{1}{32}$

Solve for x.

A $x = -4$

B $x = 4$

C $x = -6$

D $x = 6$ (1)

40. $\frac{x}{5} = \frac{1}{9}(y - 32)$

Determine y if $x = 10$.

A 14

B 43

C 13

D 50 (1)

41.

x	-3	$-\frac{1}{4}$	0	$0{,}5$	$2\frac{1}{2}$
y	9	$\frac{1}{16}$	0	$0{,}25$	P

Determine the value of P.

A $\frac{9}{2}$

B $6\frac{1}{4}$

C $4\frac{1}{4}$

D $\frac{10}{4}$

(1)

42. The length of a rectangular wall is $(x + 3)$ m and the height of the wall is $(x + 1)$ m. The area of the wall is 15 m^2.
What is the height of the wall?

A -6 m

B 2 m

C 3 m

D -5 m (1)

43. $a^2 = 36$
Solve for a.

A $a = 6$

B $a = 18$

C $a = -6$ or $a = 6$

D $a = -18$ or $a = 18$ (1)

44. $(2x-4)(x+1)=0$

Solve for x.

A $x=-2$ or $x=1$

B $x=2$ or $x=-1$

C $x=4$ or $x=-1$

D $x=-4$ or $x=1$ (1)

45. $7x-6=x^2$

Solve for x.

A $x=3$ or $x=4$

B $x=-3$ or $x=-4$

C $x=1$ or $x=6$

D $x=-1$ or $x=-6$ (1)

46. $(a+2)^2-4(a+2)+3=0$

Solve for a.

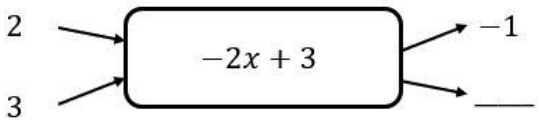
A $a=-5$ or $a=-3$

B $a=-5$ or $a=1$

C $a=3$ or $a=1$

D $a=1$ or $a=-1$ (1)

47.



What is the missing output value?

A -1

B 7

C -3

D 9 (1)

48.

x	0	1	2
y	5	8	11

Which equation represents the relationship shown in the table?

A $y = x + 5$

B $y = 3x + 5$

C $y = x + 11$

D $y = 5x + 3$ (1)

49.

x	k	-2	0	3
y	-13	-7	-1	8

The table is represented by the equation $y = 3x - 1$.

What is the value of k?

A -3

B -4

C -42

D -40 (1)

50. Which statement describes the relationship $y = 3x + 2$?

A Add 2 to 3 times the input value to get the output value.

B Add 3 to 2 times the input value to get the output value.

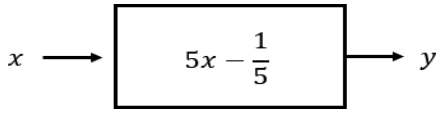
C Multiply the output value by 2 and add 3 to get the output value.

D Multiply the output value by 3 and add 2 to get the output value. (1)

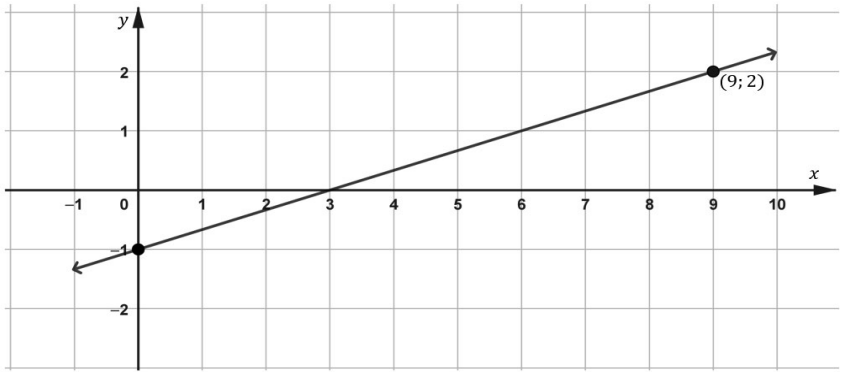
51.

x	-3	$\frac{1}{5}$	0	2	4
y	-16	0	-1	9	19

Which one of the following best describes the relationship between x and y in the above table?

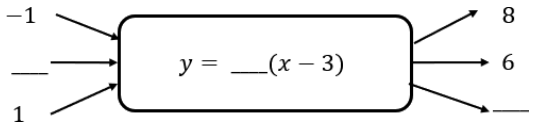
A 

B $y = \frac{1}{5}x - 1$

C 

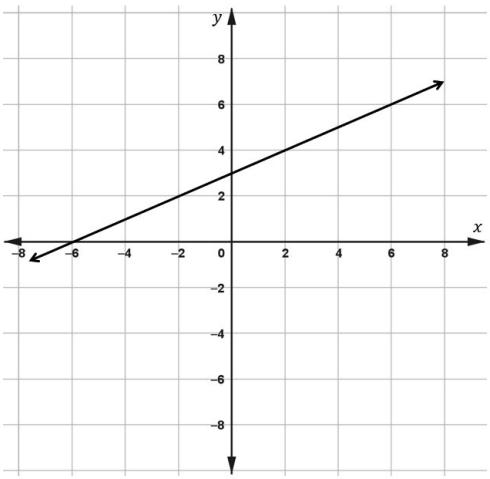
D Output value is 5 times the input value minus 1. (1)

52.

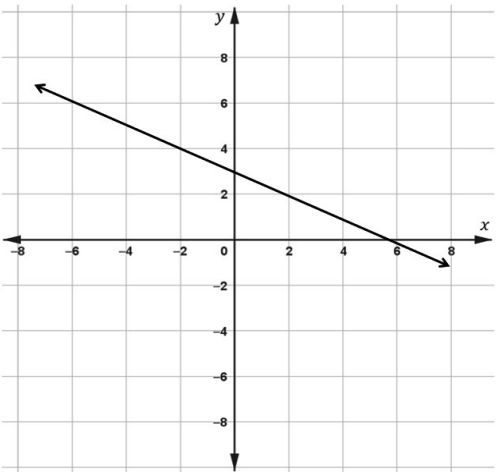


Which graph represents the flow diagram?

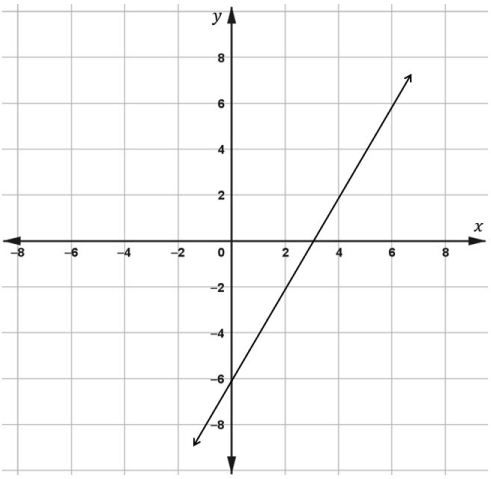
A



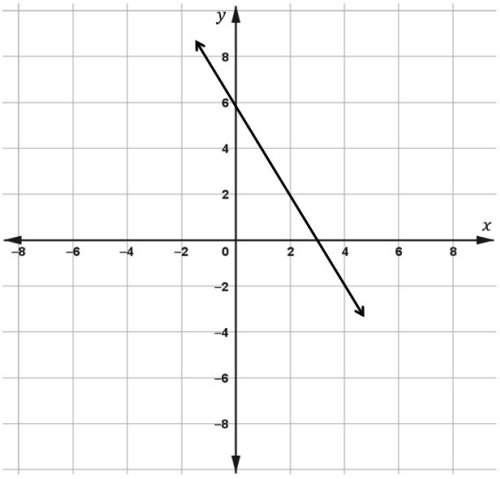
B



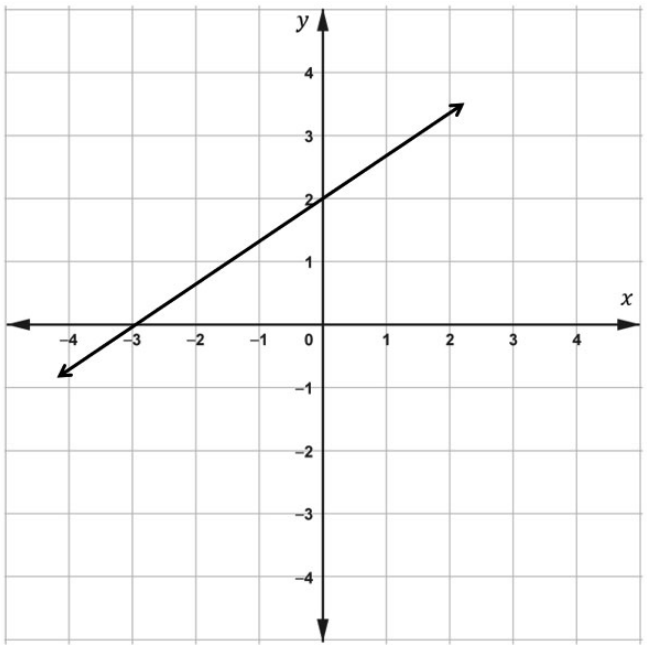
C



D



53.



What is the y-intercept of the straight line graph?

A 2

B -3

C $-\frac{2}{3}$

D $\frac{2}{3}$ (1)

54. Given: $y - 2x = -2$

What are the coordinates of the x-intercept?

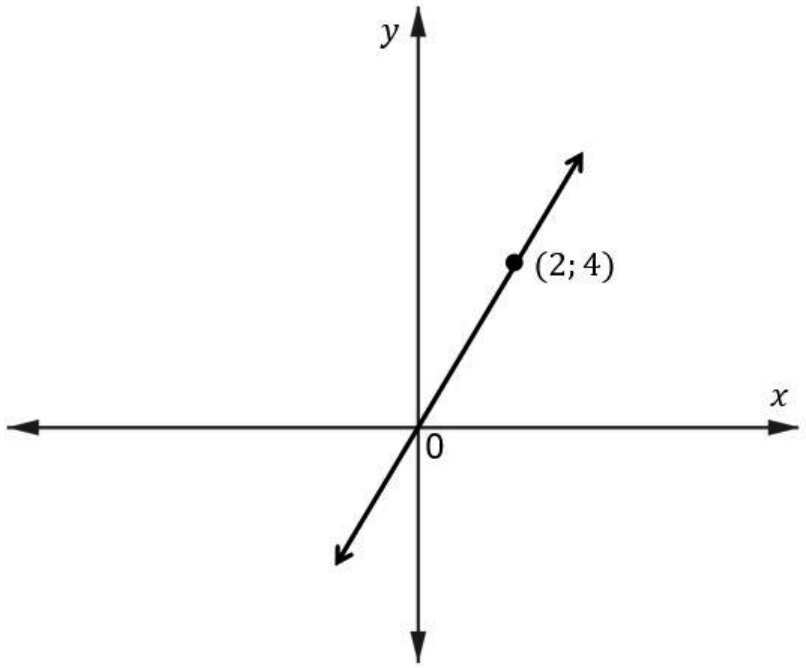
A $(-2; 0)$

B $(0; -2)$

C $(1; 0)$

D $(0; 1)$ (1)

55.



What is the gradient of the line represented by the graph?

A $-\frac{1}{2}$

B -2

C $\frac{1}{2}$

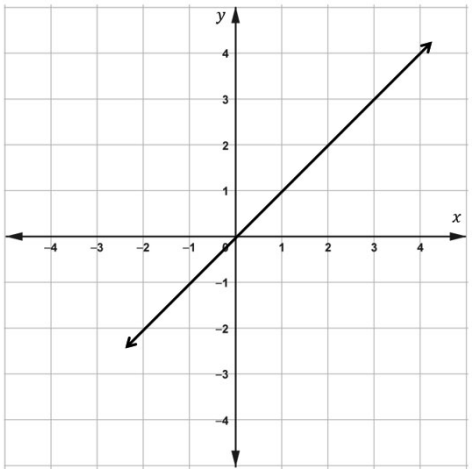
D 2 (1)

56.

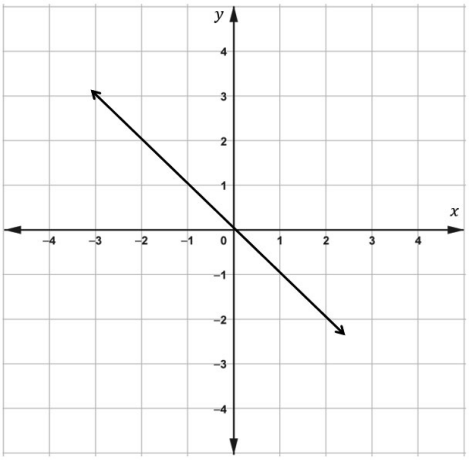
x	-2	-1	0	1
y	2	1	0	-1

Which graph represents the table?

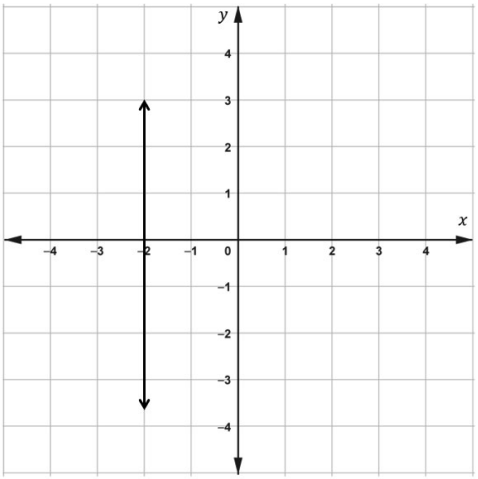
A



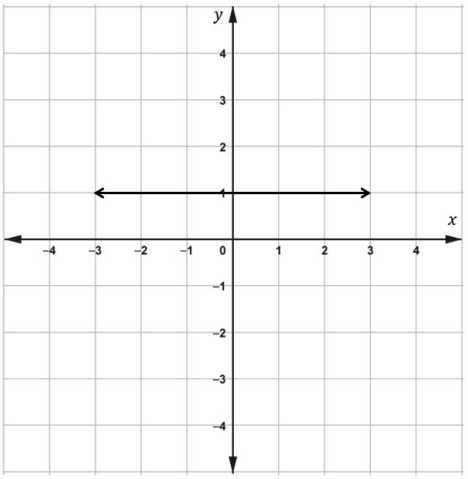
B



C



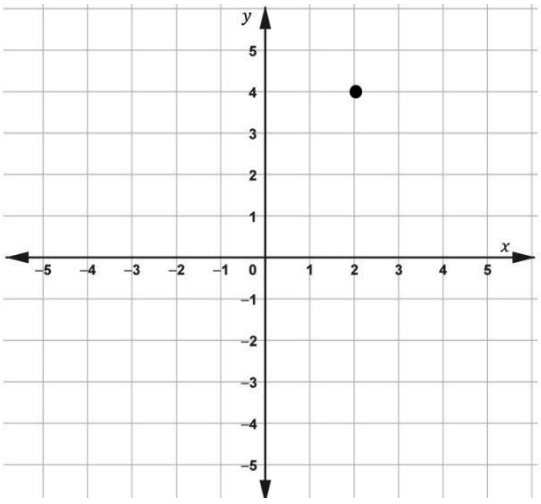
D

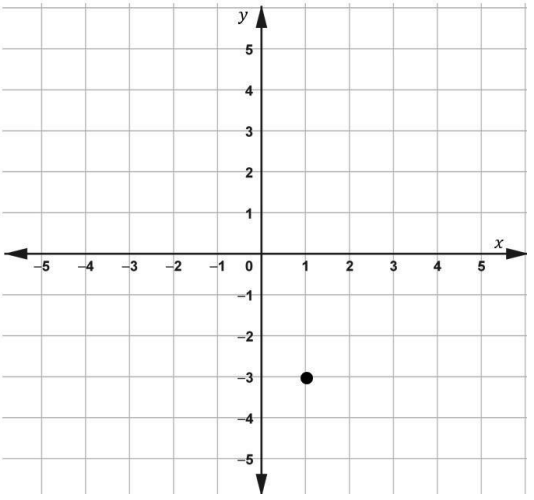


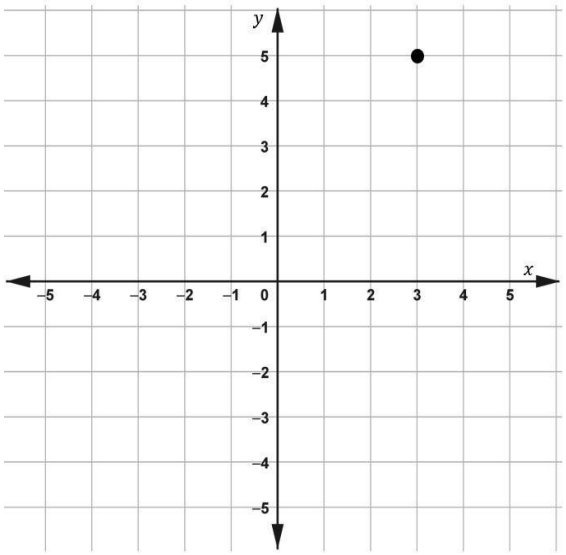
57.

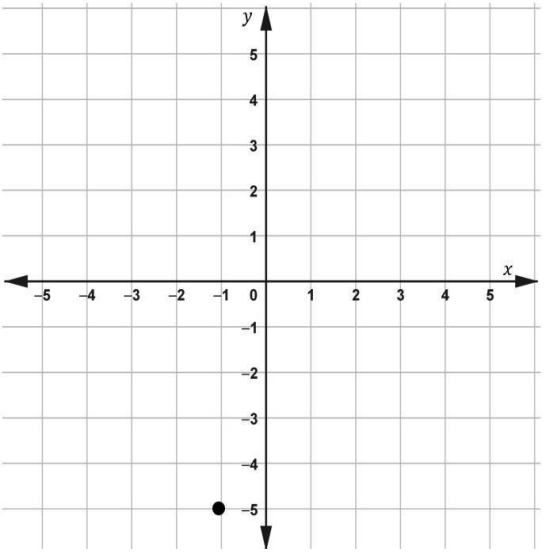
x	-1	1	2	3
y	-5	-3	4	5

Which point on the Cartesian plane is represented in the table?

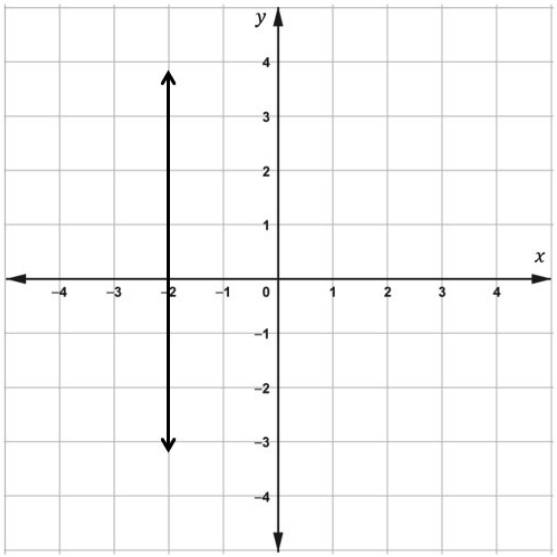
A 

B 

C 

D 

58.



Which equation represents the graph?

A $y = -2x$

B $x = -2$

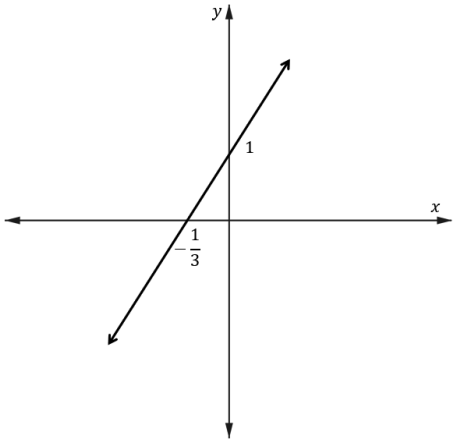
C $x = -2y$

D $y = -2$ (1)

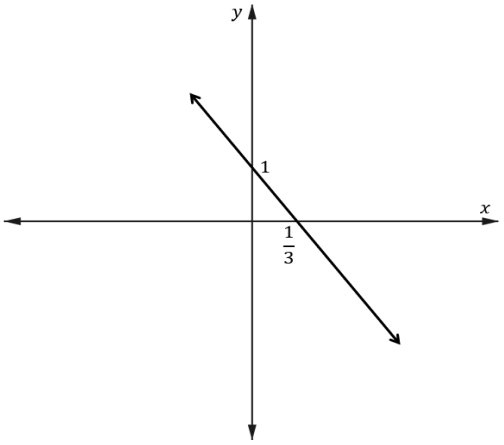
59. $y = 3x - 1$

Which graph represents the equation?

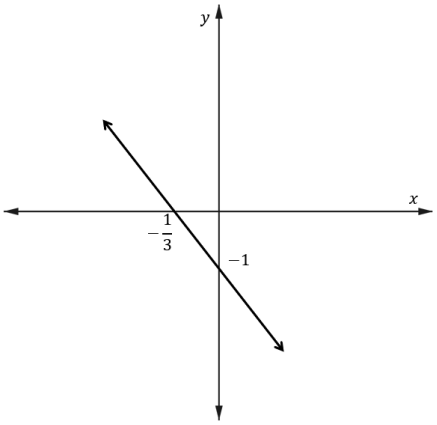
A



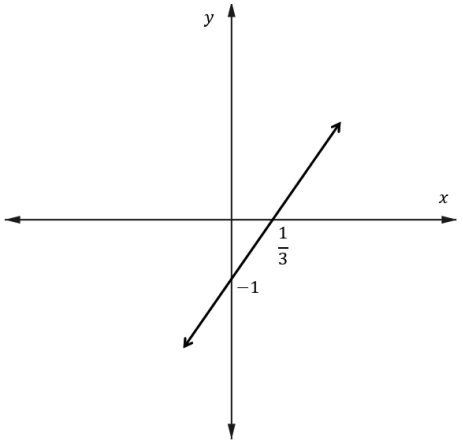
B



C

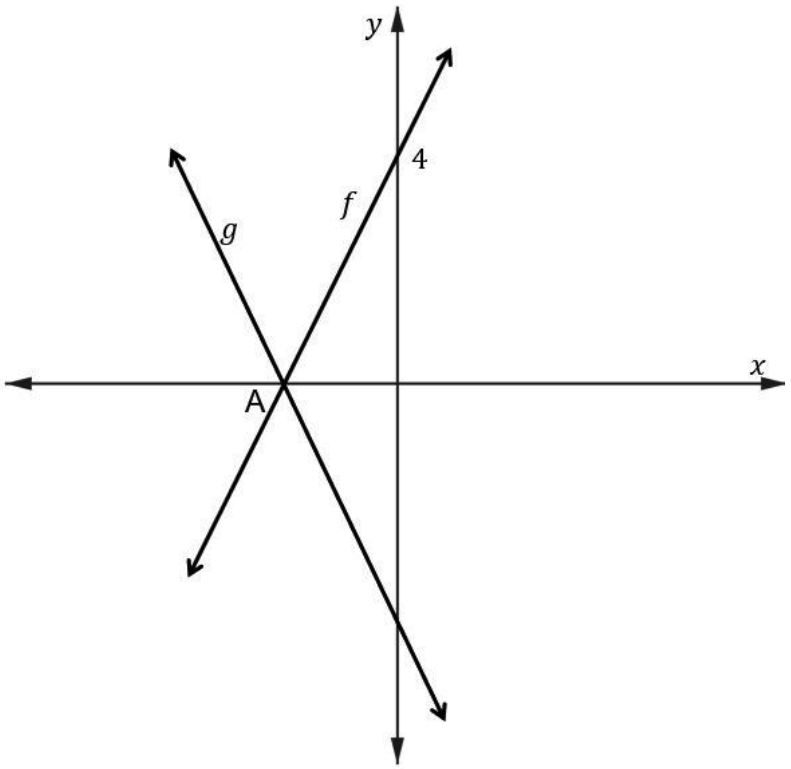


D



(1)

60.



The equation of g is $y = -2x - 4$.

What is the equation of f?

A $y = -2x + 4$

B $y = 2x + 4$

C $y = -2x - 2$

D $y = 2x - 2$

(1)

SECTION A TOTAL [60]

SECTION B

61. Simplify: (3)

$$\left(\frac{x^{-3}y}{-2x^{-2}}\right)^{-3}$$

62. Simplify: (3)

$$\frac{2m^2 - 2m}{m} \times \frac{1}{m^2 - 2m + 1}$$

63. The product of two consecutive odd numbers is equal to the difference between $3x^2$ and 12.
Determine the smaller number. (4)

64. Given: $2y + 6x = 4$

64.1 Determine the x-intercept and y-intercept. (2)

64.2 Hence, draw the graph on the Cartesian plane provided. (3)

SECTION B TOTAL [15]
TOTAL [75]

End of paper.

basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL ASSESSMENT
GENERAL EDUCATION CERTIFICATE (GEC)

2024 GRADE 9 PILOT STUDY

Subject: Mathematics

Paper: 1

Marks: 75

Duration: 2 hours

Excluding 15 minutes reading time.

This test consists of 23 pages, excluding the cover page.

Instructions to the learner:

1. You will receive 15 minutes reading time before you begin answering this test.
2. Read all the instructions and questions carefully.
3. Answer all the questions.
4. Answer all the questions in the answer booklet provided.
5. In Section A, do your calculations before choosing the correct option.
6. In Section B, show all the necessary calculations.
7. Non-programmable scientific calculators may be used, unless otherwise stated.
8. Diagrams are not necessarily drawn to scale, all lines are regarded as straight lines unless stated otherwise.

The test starts on the next page.



Do not turn the page until you are told to do so.

SECTION A

1. Which number is undefined?

   A $\frac{0}{8}$

   B $\sqrt{8}$

   C $\sqrt[3]{-8}$

   D $\frac{8}{0}$ (1)

2. Given: 125; 200 and 510

   What is the HCF of the numbers?

   A 10

   B 5

   C 17

   D 2 (1)

3. What is the LCM of 75; 450 and $1\,800$?

   A $1\,800$

   B 30

   C $3\,600$

   D 75 (1)

4.

Time	12	9	8	6
Average speed	60	80	90	120

   What is the relationship of average speed to time in the table?

   A Rate

   B Ratio

   C Indirect proportion

   D Direct proportion (1)

5. Thuto runs 6 km in 24 minutes.

How long will it take him to run 10 km at a constant speed?

A $\frac{1}{4}$ hour

B $\frac{2}{5}$ hour

C $\frac{2}{3}$ hour

D $\frac{5}{2}$ hour (1)

6. Dibolelo bought shares for R5 300 at the beginning of March 2006. She sold the shares at the end of February 2023 and received R11 291,45.
What was the compound interest rate per annum?

A $4{,}5\ \%$

B $4{,}4\ \%$

C $4{,}3\ \%$

D $4{,}1\ \%$ (1)

7. $(-a \times b)(e \times -g)$

Which of the following expressions is an example of the commutative property?

A $(-a + e) + (b - g)$

B $(-a - g) \times (b \times e)$

C $(-a \times e)(b \times -g)$

D $(-a + b)(e - g)$ (1)

8. What is the additive inverse and multiplicative inverse of $\frac{1}{5}$?

A $-\frac{1}{5}$ and -5

B $-\frac{1}{5}$ and 5

C $\frac{1}{5}$ and -5

D $\frac{1}{5}$ and 5 (1)

9. Simplify: $6-(3-5)+9-(-15)\div 3$

A 22

B 12

C 16

D 20 (1)

10. $\frac{5(3)(4)-5[3-4(3)]}{-3-2}$

What is the value of the expression?

A -21

B 3

C -3

D 27 (1)

11. Evaluate: $\frac{\sqrt[3]{125}-3^2+0+1}{-4+\sqrt{121}-\sqrt[3]{64}}$

A 1

B $\frac{5}{3}$

C $-\frac{4}{3}$

D -1 (1)

12. Simplify: $\left(\frac{\sqrt[3]{27}+\sqrt{\frac{50}{2}}}{\frac{4^2-\sqrt[3]{8}}{\sqrt{49}}}\right)^2$

A 16

B 4

C 1

D 49 (1)

13. Simplify: $3n^3 \times 2n^2$

A $6n^5$

B $5n^5$

C $6n^6$

D $5n^6$ (1)

14. Simplify: $(-2x^2y)^3$

A $8x^6y^3$

B $-8x^6y^3$

C $-8x^5y^3$

D $8x^5y^3$ (1)

15. Evaluate: $2^{-2} \times 6^3 \times 3^{-2}$

A 6

B $\frac{1}{36}$

C $\frac{1}{11}$

D 5 (1)

16. Simplify: $-3(x^{-1}y^2)^{-3} \times (xy)^{-5}$

A $\frac{-1}{9x^8y^5}$

B $\frac{1}{9x^8y^5}$

C $\frac{-3}{x^2y^{11}}$

D $\frac{-3}{x^{-2}y^{-11}}$ (1)

17. Simplify: $\left(\frac{y^2 + \frac{1}{y^{-2}}}{y^2 \times y^2}\right)^{-2}$

A $4y^4$

B $\frac{y^4}{4}$

C $-4y^4$

D $-\frac{y^4}{4}$ (1)

18. Simplify: $\frac{\sqrt{4x^6y^{-2}} \times (x^2)^{-2}}{(2x)^0 \times y^{-3}}$

A $\frac{xy^2}{2}$

B $\frac{y^2}{2x}$

C $\frac{2}{x^{-1}y^2}$

D $\frac{2y^2}{x}$ (1)

19. $\frac{1}{2}; \frac{3}{2}; \frac{5}{2}; \frac{7}{2}; \ldots$

Which statement best describes the rule of the pattern?

A Add 2 to the previous term to get the next term.

B Add 1 to the previous term to get the next term.

C Numerators are odd numbers.

D Denominators are equal to 2. (1)

20. $0; 1; 1; 2; 3; 5; \ldots$

What are the next two terms in the sequence?

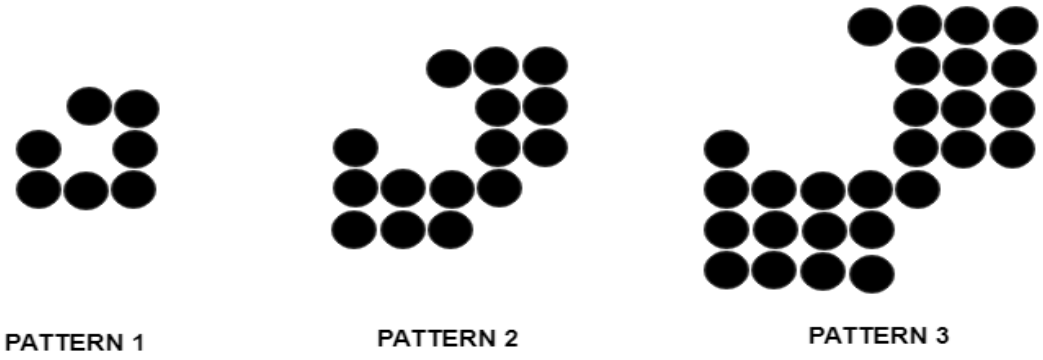
A $8; 13$

B $7; 9$

C $6; 8$

D $7; 13$ (1)

21.



Which pattern represents pattern 4?

A 

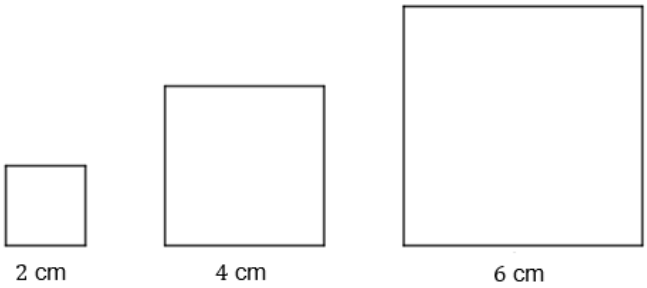
B 

C 

D 

(1)

22. Jay makes a pattern with squares.



What will the area of the 9th square be?

A 324 cm^2

B 256 cm^2

C 81 cm^2

D 18 cm^2 (1)

23. Which of the following are like terms?

A $2pqr^2$ and $4p^2qr$

B $-7pq^2$ and $-7pr^2$

C $5pq^2r$ and $2pqr^2$

D $-3pq^2r$ and $5pq^2r$ (1)

24. $-2x^3 + 3x^2 - x + 8$

What is the exponent of the term with the smallest coefficient?

A 0

B 1

C 2

D 3 (1)

25. $-5xy \times x^5 - \frac{y^2}{3} + 5(x)$

How many terms are in the expression?

A 6

B 5

C 4

D 3 (1)

26. Simplify: $-3y(2y^2 - 4y) - 1$

A $-6y^3 + 12y^2 - 1$

B $6y^3 - 12y^2 - 1$

C $-6y^3 + 12y^2 + 3y$

D $6y^3 - 12y^2 - 3y$ (1)

27. Simplify: $\frac{15y^3 - 3y(-y + 2) + 6y^2}{3y}$

A $5y^2 + y - 2$

B $3y^3 + 5y^2 - 2$

C $11\mathrm{y}^2 + \mathrm{y} - 2$

D $5y^2 + 3y - 2$ (1)

28. Simplify: $\sqrt{y^8 + \frac{9}{16}y^8}$

A $\frac{5y^8}{4}$

B $\frac{7y^4}{4}$

C $\frac{5y^4}{4}$

D $\frac{7y^8}{4}$ (1)

29. $\left(4x - \frac{1}{2}\right)^2$

What is the product?

A $16x^2 - \frac{1}{4}$

B $16x^2 - 4x + \frac{1}{4}$

C $16x^2 + \frac{1}{4}$

D $16x^2 - 4x - \frac{1}{4}$ (1)

30. $\frac{9p^2 - 8q}{r}$

What is the numerical value of the expression if

$p = -1, q = 0{,}125$ and $r = \frac{1}{2}$?

A 4

B 7

C 16

D 20 (1)

31. Factorise: $25a^2 - 16b^2$

A $(5a - 4b)(5a + 4b)$

B $(5a + 16b)(5a - 16b)$

C $(25a - 4b)(25a + 4b)$

D $(25a + 16b)(25a - 16b)$ (1)

32. Factorise: $y^2 - 11y + 28$

A $(y - 4)(y + 7)$

B $(y + 7)(y + 4)$

C $(y - 7)(y - 4)$

D $(y + 4)(y - 7)$ (1)

33. Factorise: $9p^2 + 27p - 90$

A $9(p + 5)(p + 2)$

B $9(p - 2)(p + 5)$

C $9(p - 5)(p + 2)$

D $9(p - 2)(p - 5)$ (1)

34. Simplify: $\frac{2a^2 - 10a + 12}{a(a + 2) - 3(a + 2)}$

A $\frac{2(a + 3)}{a - 3}$

B $\frac{2(a - 3)}{a + 3}$

C $\frac{2(a - 2)}{a + 2}$

D $\frac{2(a + 2)}{a - 2}$ (1)

35. Simplify: $\frac{48r - 3r(p + q)^2}{12r + 3pr + 3qr}$

A $4 - p + q$

B $4 + p - q$

C $4 - p - q$

D $4 + p + q$ (1)

36. $-2 = -4m$

What is the value of m?

A $-\frac{1}{2}$

B 2

C -2

D $\frac{1}{2}$ (1)

37. $\frac{a}{7} = -2$

What is the value of a?

A 14

B -14

C -9

D 9 (1)

38. Solve: $(x-4)^2 = 0$

A $x = 4$

B $x = -4$

C $x = 2$ or $x = -2$

D $x = 0$ or $x = 4$ (1)

39. $(x-3)(1-x) = 0$

What are the values of x?

A $x = 3$ or $x = -1$

B $x = -3$ or $x = 1$

C $x = 3$ or $x = 1$

D $x = -3$ or $x = -1$ (1)

40. Marius buys cell phones for x rands each and sells them to make a profit. He determines his selling price, y rands, for each phone by doubling the price he paid and then subtracting three rand.

Which equation represents the scenario?

A $y = (x-3)^2$

B $y = 2(x-3)$

C $y = x^2 - 3$

D $y = 2x - 3$ (1)

41. The perimeter of a square is given as P $= 4(x - 1)$ and P $= 16$ cm.
What is the value of x?

A 5
B 21
C 3
D 13 (1)

42. $y = x^2 - 1$

x	-2	-1	0	1	2
y	3	0	-1	1	3

Which ordered pair does **NOT** satisfy the equation?

A $(-2; 3)$
B $(0; -1)$
C $(1; 1)$
D $(2; 3)$ (1)

43. $x^2 - 3x - 18 = 0$
What are the values of x?

A $x = -6$ or $x = -3$
B $x = 6$ or $x = -3$
C $x = -6$ or $x = 3$
D $x = 6$ or $x = 3$ (1)

44. $2^m + 0{,}5 = 8^0$
What is the value of m?

A 1
B -1
C 2
D -3 (1)

45. $\frac{6x}{3} - x = 4x^2$

Determine the values of x.

A 0 or $\frac{1}{4}$

B 3 or $\frac{1}{4}$

C 0 or $-\frac{1}{4}$

D 3 or $-\frac{1}{4}$ (1)

46. The product of two consecutive even numbers is 120.

Determine the two numbers.

A -30 and 4

B 30 and 4 or -4 and -30

C 10 and 12 or -10 and -12

D -10 and 12 (1)

47.

Input	-1	2	5	8
Output	b	-1	2	5

What is the value of b?

A -2

B -4

C 2

D 4 (1)

48. $y = -2x - 3$

What is the output value if the input value is -5?

A -3

B -5

C 7

D 1 (1)

49. 

What is the rule used in the flow diagram?

A Multiply by -2

B Multiply by -1

C Multiply by -6

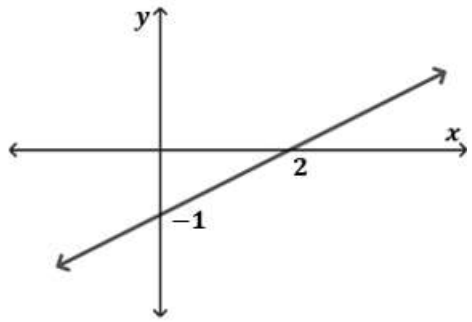
D Multiply by -3 (1)

50.

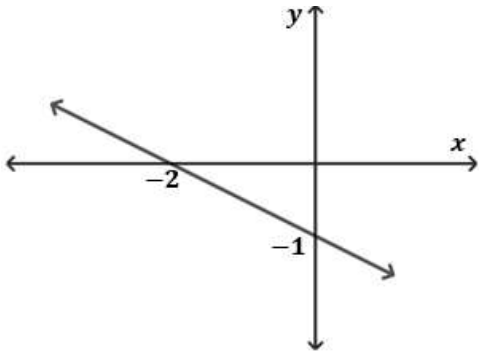
x	-2	-1	0	1	2	3
y	0	$\frac{1}{2}$	1	$\frac{3}{2}$	2	$\frac{5}{2}$

Which graph represents the relationship between x and y in the table?

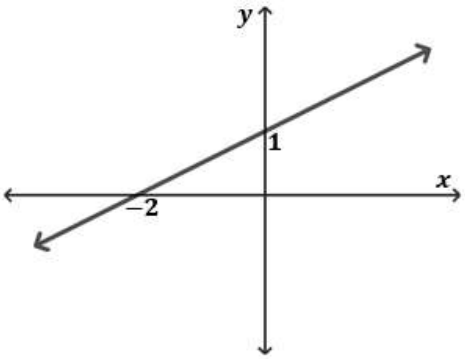
A



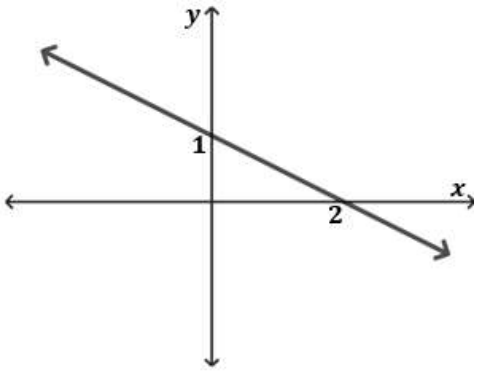
B



C

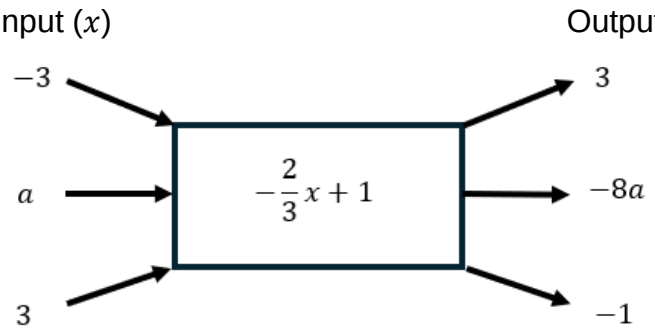


D



(1)

51.



What is the value of a?

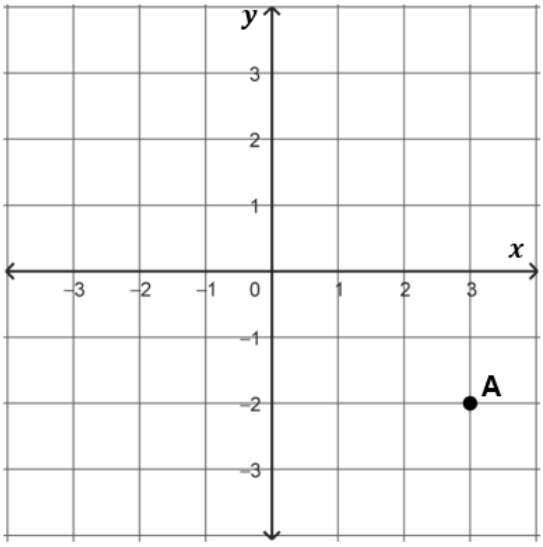
A -3

B 3

C $\frac{3}{26}$

D $\frac{-3}{22}$ (1)

52. Point A$(3;-2)$ is translated 1 unit to the left and 2 units up to point A′. Points A and A′ are joined to form a straight line.



Which equation represents the straight line?

A $y=-2x$

B $y=-2x+4$

C $y=2x-4$

D $y=2x$ (1)

53. $y = -2x + 3$

What are the coordinates of the y-intercept?

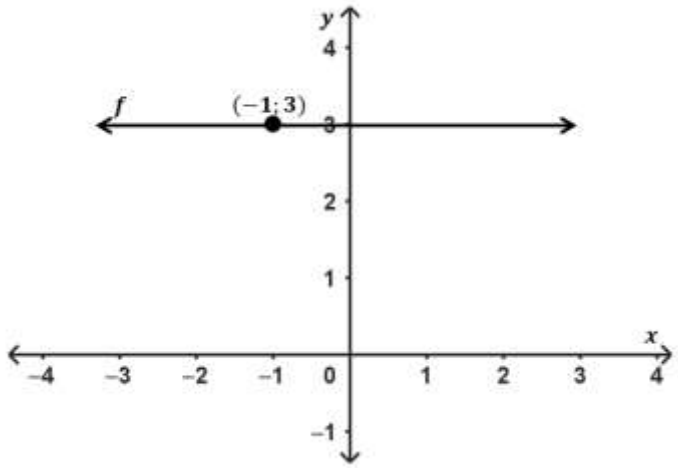
A $(-2;0)$

B $(0;-2)$

C $(0;3)$

D $(3;0)$ (1)

54.



What is the equation of f?

A $x = 3$

B $y = 3$

C $y = -1$

D $x = -1$ (1)

55. $y = -\frac{3}{2}x + \frac{5}{2}$

What is the gradient of the line?

A 2

B 3

C $-\frac{2}{3}$

D $-\frac{3}{2}$ (1)

56.

x	-2	0	1
y	0	-2	-3

Which equation is represented by the table?

A $y = -x - 2$

B $y = x - 2$

C $y = -2x + 1$

D $y = 2x - 3$ (1)

57. $4x + 2y = 8$

What are the coordinates of the x- and y-intercepts of the graph represented by the equation?

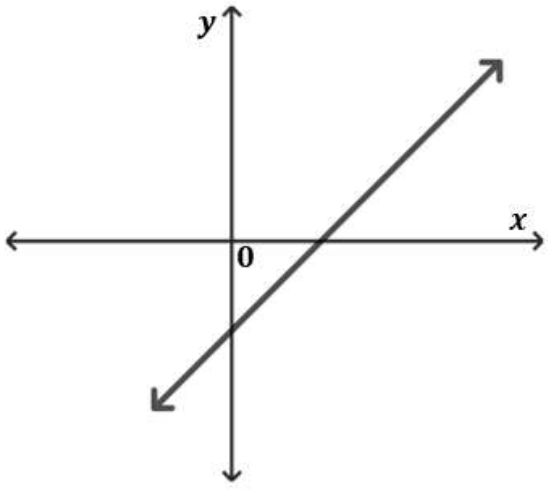
A $(0; -2)$ and $(8;0)$

B $(8;0)$ and $(-2;0)$

C $(4;0)$ and $(0;2)$

D $(2;0)$ and $(0;4)$ (1)

58. The graph represents $y = mx + c$.



What can be deduced from the graph?

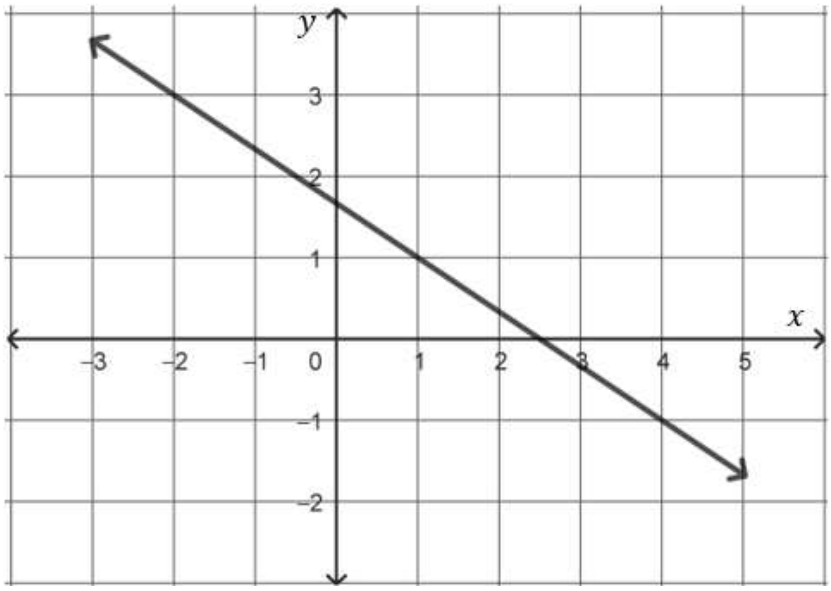
A $c > 0; m > 0$

B $c > 0; m < 0$

C $c < 0; m > 0$

D $c < 0; m < 0$ (1)

59.



What is the gradient of the line?

A $\frac{3}{2}$

B 1

C -1

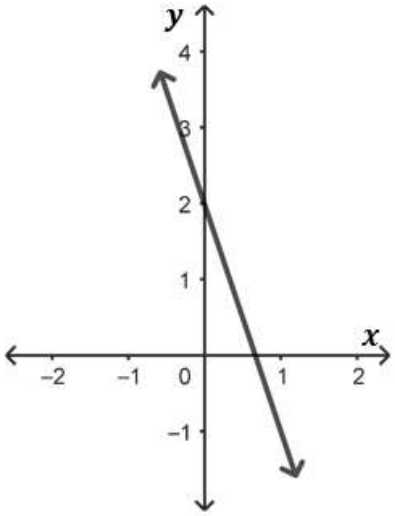
D $-\frac{2}{3}$

(1)

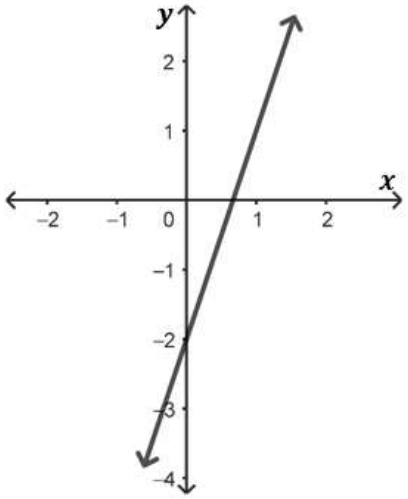
60. $2y - 6x - 4 = 0$

Which graph represents the equation?

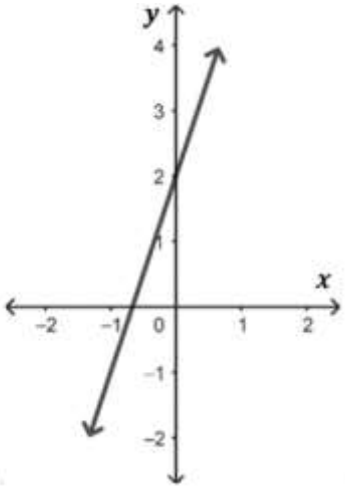
A



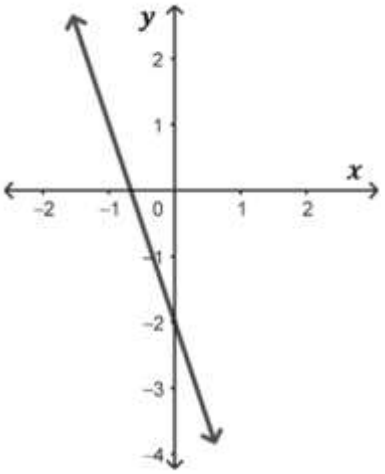
B



C



D



(1)

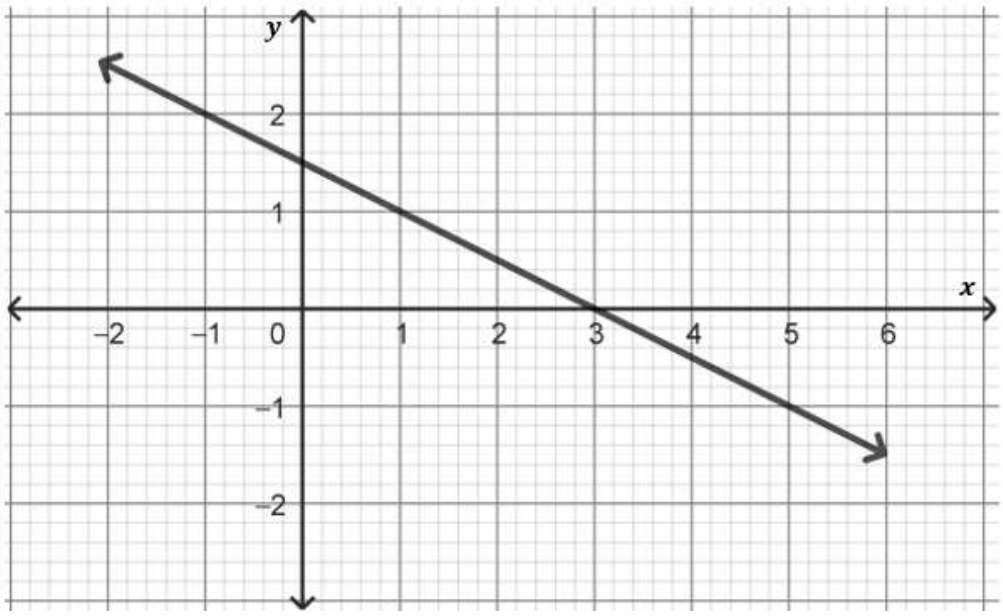
SECTION A TOTAL [60]

SECTION B

61. Simplify completely: $\dfrac{-5x(2x-4x^2)+x^2(1+16x)}{-3x}$ (3)

62. Solve for x: $2x^2-6x=(x-3)(x+3)$ (3)

63.



Determine the equation of the line. (5)

64. Blocks are stacked in layers. There is one block in the first layer. Each layer increases by the same number of blocks. 16 blocks are used to stack 4 layers.
How many blocks are needed in total to stack ten layers? (4)

SECTION B TOTAL [15]

TOTAL [75]

End of test.

basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL ASSESSMENT
GENERAL EDUCATION CERTIFICATE (GEC)

2023 GRADE 9 PILOT STUDY

Subject: Mathematics: English

Paper: 1

Marks: 75

Duration: 150 Minutes

excluding 15 minutes reading time.

This test consists of 26 pages, excluding the cover page.

Instructions to the learner:

1. You will receive 15 minutes reading time before you begin answering the paper.
2. Read all the instructions and questions carefully.
3. Answer all questions.
4. Use the provided answer booklet to write all your answers.
5. Do your calculations before choosing the correct answer in Section A.
6. Non-programmable scientific calculators may be used.
7. Diagrams are not necessarily drawn to scale, all lines are regarded as straight lines unless otherwise stated.

The test starts on the next page.



Do not turn the page until you are told to do so.

SECTION A

1. Which word best describes $-\sqrt{3}$?

   A Rational
   B Irrational
   C Undefined
   D Non-real (1)

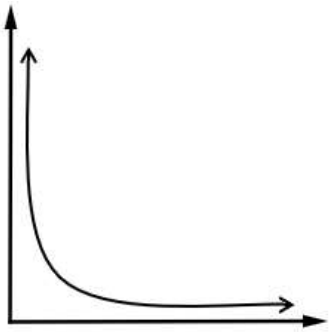
2. Given: 12; 18 and 27.
   What is the LCM of the numbers?

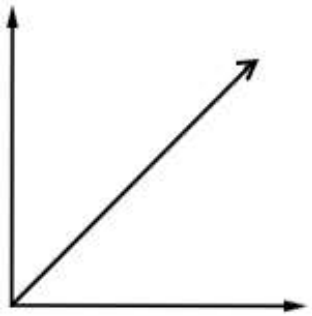
   A 144
   B 108
   C 72
   D 54 (1)

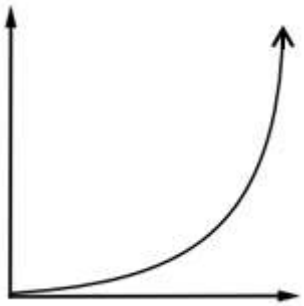
3. Given: $\frac{8}{30}$ and $\frac{12}{36}$.
   What is the HCF of the numbers?

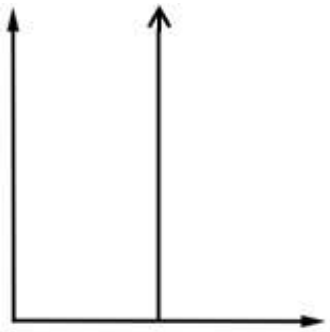
   A $\frac{2}{3}$
   B $\frac{2}{6}$
   C $\frac{1}{6}$
   D $\frac{4}{3}$ (1)

4. Which graph represents direct proportion?

A 

C 

B 

D 

(1)

5. A car travelling at 120 km/h covers a certain distance in 2 hours 45 minutes.
The car then travels the same distance in 3 hours and 12 minutes.
What is the constant speed that the car travels?

A 103,13 km/h
B 330 km
C 94,23 km/h
D 294 km (1)

6. R5 265 is invested at 12% per annum compound interest for 24 months.
How much interest will the investment earn in 24 months?

A R79 915,48
B R74 650,48
C R6 604,42
D R1 339,42 (1)

7. $(-7 \times 11) \times 4$

Which expression represents the associative property?

A $(-7 \times 4) + (11 \times 4)$

B $(-7 \times 4) \times (11 \times 4)$

C $-7 \times (11 \times 4)$

D $4 \times (-7 \times 11)$ (1)

8. $3(-2 + 6) - 2(5 - 4 + 1) = \cdots$

A 16

B 8

C 11

D 7 (1)

9. What are the additive and multiplicative inverses of -2?

A 2 and $\frac{1}{2}$

B -2 and $-\frac{1}{2}$

C $-\frac{1}{2}$ and -2

D 2 and $-\frac{1}{2}$ (1)

10. $\frac{2(-3) - (5) - 4(6 \div 8)}{5 - 6} = \cdots$

A 15

B 2

C 14

D 3 (1)

11. $\sqrt{49} - 2^3 + \sqrt[3]{216} \div 3 = \cdots$

A 1

B $1\frac{2}{3}$

C -1

D $2\frac{1}{3}$ (1)

12. Simplify: $\sqrt{\frac{\sqrt[3]{-64}+5}{4^2+3^2}}$

A $\frac{1}{7}$

B $-\frac{3}{5}$

C $\frac{1}{5}$

D $-\frac{3}{7}$ (1)

13. Simplify: $a^3 \times a^2c$

A a^5c

B a^6c

C $2a^5c$

D $2a^6c$ (1)

14. Simplify: $\frac{4^{x+1}}{2^x}$

A 2^{x+1}

B 2^{3x+1}

C 2^{x+2}

D 2^{3x+2} (1)

15. Simplify: $a^{-1} + b^{-1}$

A $\frac{1}{a+b}$

B $\frac{b+a}{ab}$

C $\frac{2}{a+b}$

D $\frac{-b-a}{ab}$ (1)

16. Simplify: $(2^2)^3 \times (2^3)^{-2}$

A 12

B 1

C 64

D 4 (1)

17. Simplify: $\left(\frac{x^{-3}y}{-2x^{-2}}\right)^{-3}$

A $-\frac{8x^3}{y^3}$

B $\frac{8y^3}{x^3}$

C $\frac{8x^3}{y^3}$

D $-\frac{8x^{15}}{y^3}$ (1)

18. Simplify: $\frac{3(x+y)^0}{y} + 5y^{-1} - \frac{\left(x^{-1}y\right)^3}{x^{-3}y^4}$

A $\frac{5}{y}$

B $\frac{11}{5y}$

C $\frac{7}{3y}$

D $\frac{7}{y}$ (1)

19. $3;\ 8;\ 15;\ 24;\ \ldots$

What is the next term in the pattern?

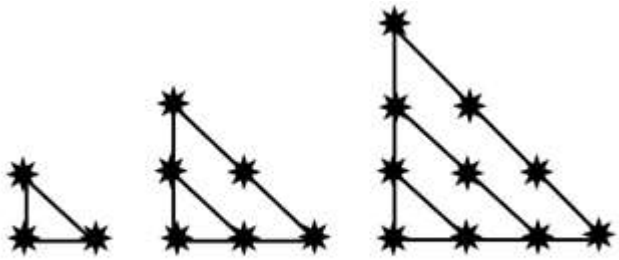
A 33

B 35

C 36

D 37 (1)

20.



How many stars (✸) will be visible in total up to the 6^{th} pattern?

A 55

B 36

C 83

D 28 (1)

21. $1;\ 3;\ 9;\ 27;\ \ldots$

Which statement best describes the pattern?

A A constant ratio of three is used.

B A constant difference of three is used.

C Multiples of three are used to form the pattern.

D Cubic numbers are used to form the pattern. (1)

22.

$\boldsymbol{n}$	1	3	5	7
$\boldsymbol{T_n}$	5	1	-3	-7

What is the general term of the relationship represented by the table?

A $T_n = 4n + 1$

B $T_n = -4n + 9$

C $T_n = -2n + 7$

D $T_n = 2n + 3$ (1)

23. $3x^3 + 3x(x^2) + 3x^2 + 3x$

Which of the following are like terms?

A $3x^3$ and $3x(x^2)$

B $3x^3$ and $3x^2$

C $3x(x^2)$ and $3x^2$

D $3x(x^2)$ and $3x$ (1)

24. $(-2x^2)^3$

What is the coefficient of the variable and the degree of the term?

A -2 and 2^{nd}

B 8 and 5^{th}

C 2 and 3^{rd}

D -8 and 6^{th} (1)

25. Which of the following is a trinomial when simplified?

A $2x^2 - x^2 + 0$

B $3x^2 + 2 - x^2$

C $x + 3x^2 + 2 - 4x$

D $2x^0 + 3 + x + 2$

26. Simplify: $-x(4x^2 + 2x - 1)$

A $-4x^3 - 2x^2 + x$

B $4x^3 + 2x^2 - x$

C $4x^2 + 2x - 1$

D $-4x^2 - 2x + 1$ (1)

27. Simplify: $3x(x - 4) + \frac{4x+2}{2}$

A $3x^2 - 10x + 1$

B $3x^2 + 2x - 11$

C $6x^2 - 20x + 2$

D $6x^2 - 22x + 1$ (1)

28. Simplify: $\sqrt[3]{0{,}125x^3}$

A $\frac{x}{2}$

B $\frac{x^3}{2}$

C $0{,}125x$

D $0{,}125x^3$ (1)

29. $(x+3)(2x-\frac{1}{3})$

What is the product?

A $2x^2-1$

B $2x^2+1$

C $2x^2+\frac{17x}{3}-1$

D $2x^2+\frac{19x}{3}-1$ (1)

30. $-8x^2+10y-2$

What is the numerical value of the expression if $x=-\frac{1}{2}$ and $y=2$?

A 20

B 22

C 14

D 16 (1)

31. Factorise: $4x^2-9$

A $(2x-3)(2x+3)$

B $(2x-9)(2x+9)$

C $(4x-3)(4x+3)$

D $(4x-9)(4x+9)$ (1)

32. Factorise: $x^2-5x-24$

A $(x+8)(x+3)$

B $(x-8)(x+3)$

C $(x-8)(x-3)$

D $(x+8)(x-3)$ (1)

33. Factorise: $6y^2 - 12y - 18$

A $6(y-3)(y+1)$

B $6(y+3)(y+1)$

C $6(y-3)(y-1)$

D $6(y+3)(y-1)$ (1)

34. Simplify: $\frac{2x^2-2x-12}{2x-6}$

A $x-2$

B $x+2$

C $2x^2-2$

D $2x^2+2$ (1)

35. Simplify: $\frac{(x+y)^2-1}{x+y-1}$

A $x+y+1$

B $x-y+1$

C $x-y-1$

D $x+y\ -1$ (1)

36. Solve: $x+1=3$

A 2

B 4

C -2

D -4 (1)

37. Solve: $2p = 4$

A 6
B 2
C 8
D 4 (1)

38. Solve: $x(x - 1) = 0$

A $x = 0$
B $x = 1$
C $x = 0$ or $x = -1$
D $x = 0$ or $x = 1$ (1)

39. Solve: $(b - 3)(b + 2) = 0$

A $b = -3$ or $b = -2$
B $b = -3$ or $b = 2$
C $b = 3$ or $b = 2$
D $b = 3$ or $b = -2$ (1)

40. Two times a certain number decreased by eight is equal to 18.
What is the equation?

A $2(x - 8) = 18$
B $2x - 8 = 18$
C $2x + 8 = 18$
D $2(x + 8) = 18$ (1)

41. Given: $y = m^2 - 3m$ and $m = 4$.

What is the value of y?

A 5

B -4

C 4

D -8

42. Solve: $3^m = \frac{1}{9}$

A 1

B 2

C -2

D -3 (1)

43. $y = x^2 + 1$

x	-4	-2	1	3	t
y	p	5	2	10	37

What is the value of p and t?

A $p = 10$ and $t = 5$

B $p = -15$ and $t = 5$

C $p = -15$ and $t = 6$

D $p = 17$ and $t = 6$ (1)

44. Solve: $x(x + 3) + 2(x - 3) = 0$

A $x = -3$ or $x = -2$

B $x = 3$ or $x = 2$

C $x = 6$ or $x = 1$

D $x = -6$ or $x = 1$ (1)

45. Solve: $(\frac{1}{2}a - 1)^2 = 1$

A $a = 0$ or $a = 1$

B $a = 0$ or $a = 4$

C $a = 0$ or $a = -1$

D $a = 0$ or $a = -4$ (1)

46. A rectangle has an area of 40 m² and its breadth is 18 m less than its length. What is the breadth of the rectangle?

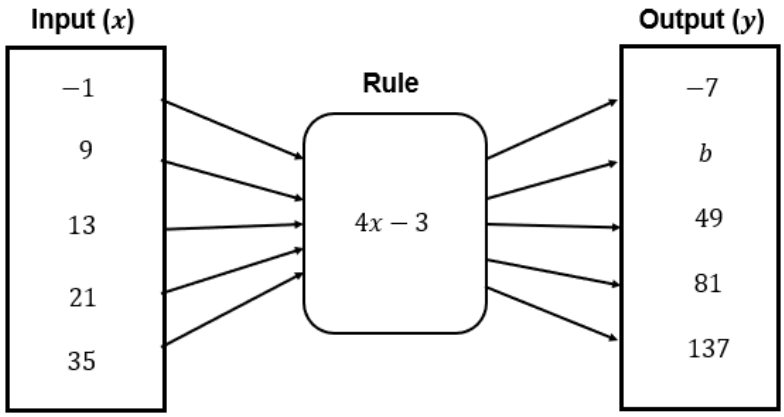
A 1 m

B 2 m

C 19 m

D 20 m (1)

47. Consider the following flow diagram.



What is the value of b?

A $b = 33$

B $b = 3$

C $b = 9$

D $b = 39$ (1)

48. Given: $y = 3x - 2$.

Which table represents the equation?

A

$\boldsymbol{x}$	-4	-1	2
$\boldsymbol{y}$	-10	-5	4

B

$\boldsymbol{x}$	-3	0	3
$\boldsymbol{y}$	-11	2	7

C

$\boldsymbol{x}$	-2	0	2
$\boldsymbol{y}$	-8	-2	4

D

$\boldsymbol{x}$	-1	1	2
$\boldsymbol{y}$	-5	1	3

49. All the inputs (n) are even numbers greater than 2.

All the outputs (m) are odd numbers.

Which equation applies?

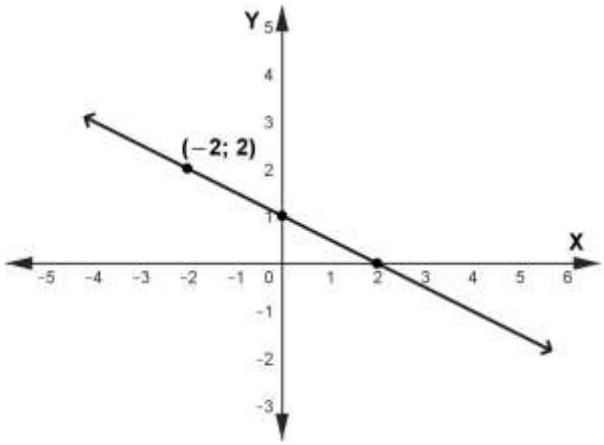
A $m = 5n + \frac{n}{2}$

B $m = (n + 1)^2$

C $m = n(n + 4)$

D $m = \frac{1}{2}n + 3$ (1)

50.



Which of the following describes the relationship between x and y in the graph?

A

x	-2	1	0
y	2	0	2

B An increasing linear function.

C $x \rightarrow \boxed{-\frac{1}{2}x + 2} \rightarrow y$

D $y = -\frac{1}{2}x + 1$ (1)

51. The following table represents the volume (V) of water pumped from a dam into a reservoir at any given time(t).

Time(t) in minutes	1	2	3	4	5	6
Volume(V) in kilolitres	10	14	18	22	26	30

Which formula is used to determine the volume of water in the reservoir at any given time?

A $V = 4t + 41$

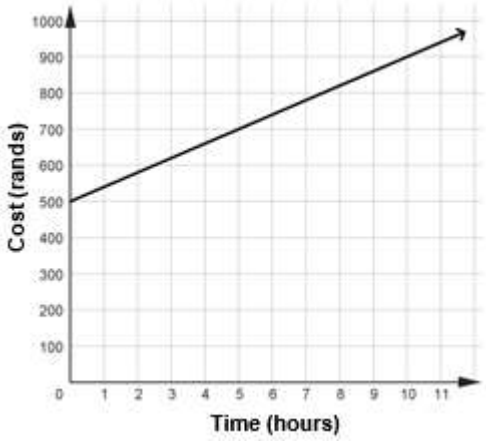
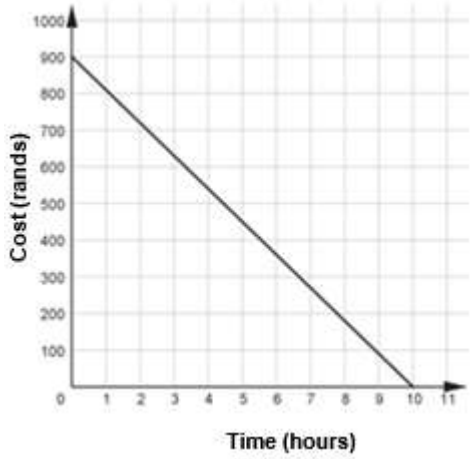
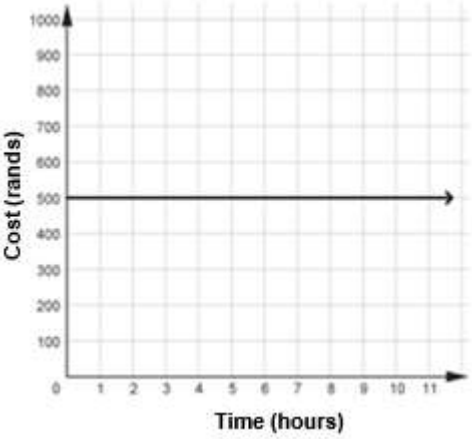
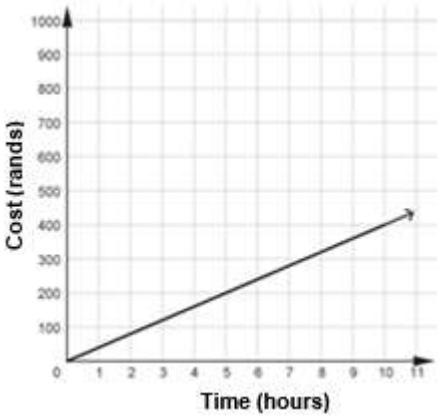
B $V = 4t + 10$

C $V = 6t + 4$

D $V = 4t + 6$ (1)

52. A plumber charges a once-off administration fee of R500 and an additional cost of R40 per hour.

Which graph represents the cost when the plumber is hired?

	A		C		
	B		D		(1)

53. Which point is the y-intercept of a graph?

A $(-3; 2)$

B $(0; -5)$

C $(-5; 0)$

D $(1; -4)$ (1)

54. The equation of a line is $x + 2 = 3x - y$.

Where does this line cut the X-axis?

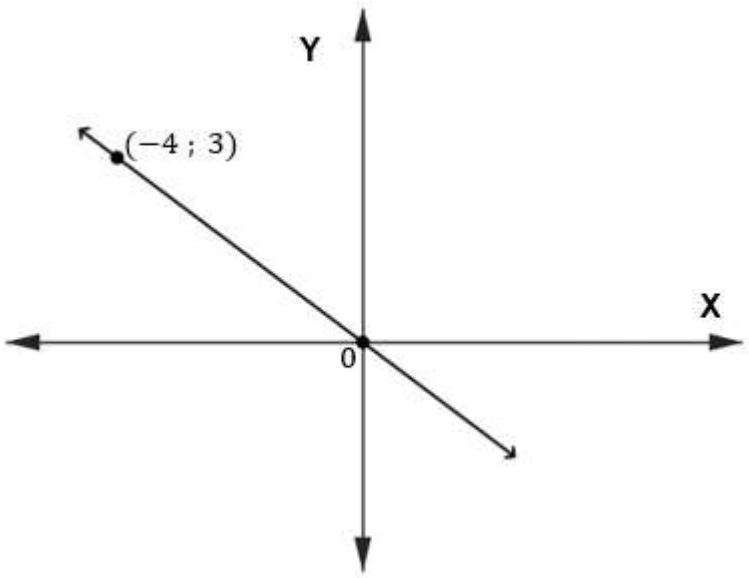
A -2

B 2

C -1

D 1 (1)

55.



What is the gradient of the line?

A $-\frac{4}{3}$

B $\frac{4}{3}$

C $-\frac{3}{4}$

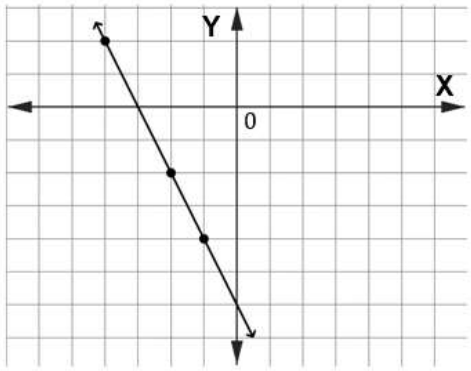
D $\frac{3}{4}$ (1)

56. The table is used to draw the graphs below.

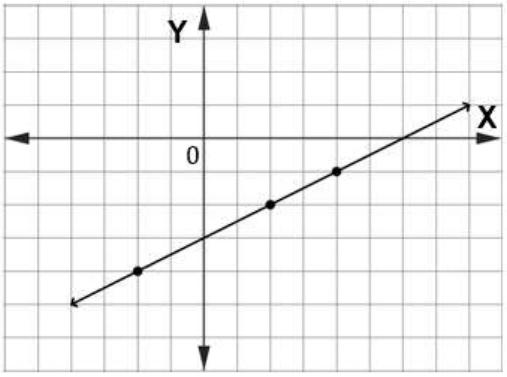
x	-4	-2	2
y	-1	-2	-4

Which graph represents the ordered pairs?

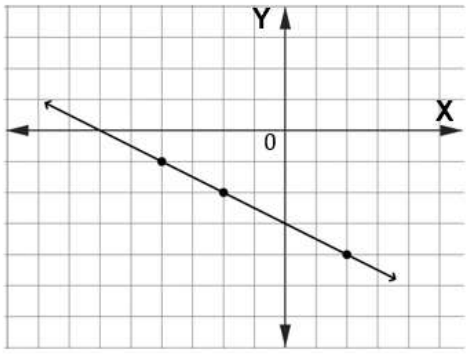
A



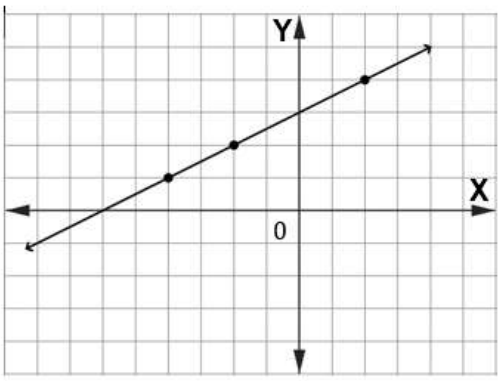
C



B



D



(1)

57. The tables below represent the coordinates of points on different types of graphs.
Which table represents a straight line graph?

A

x	1	2	3	4
y	12	6	4	3

B

x	1	2	3	4
y	1	4	9	16

C

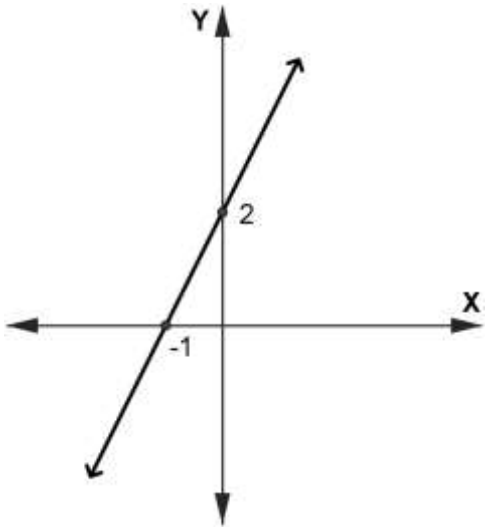
x	1	2	3	4
y	12	20	28	36

D

x	1	2	3	4
y	1	8	27	64

(1)

58.



Which equation describes the graph?

A $y = -2x + 2$

B $2x - y - 1 = 0$

C $y + 1 = 2x$

D $-2x + y - 2 = 0$ (1)

59. Given: $y = 2x - 1$.

Which coordinates satisfy the equation?

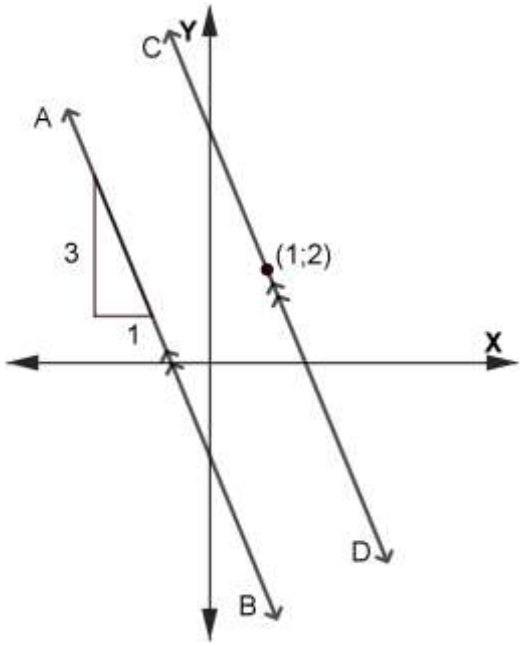
A $(-2; 3)$

B $(-1; -3)$

C $(-1; 0)$

D $(-2; -3)$ (1)

60. In the diagram AB∥CD, CD passes through the point $(1; 2)$.



What is the equation of CD?

A $y = -3x + 5$

B $y = 3x + 2$

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

D $y = \frac{1}{3}x + 1\frac{2}{3}$ (1)

[60]

SECTION B

61.

$\boldsymbol{x}$	1	2	3	q
$\boldsymbol{y}$	-2	1	4	46

What is the value of q? (3)

62. $\frac{y^2(6y-1)}{-y} - \frac{3y^2(5-10y^2)}{5y^2}$

Simplify completely. (3)

63. A car has an engine with a mass of $\frac{1}{5}$ of its total mass.

The mass of the wheels is 120 kg.

The remaining mass of the car is 900 kg.

What is the mass of the car's engine? (4)

64. Given:

$\boldsymbol{x}$	-3	0	6
$\boldsymbol{y}$	-2	-1	1

64.1 Use the points from the table to draw a graph on the Cartesian plane provided in the answer book. (3)

64.2 Draw the graph $x = -3$ on the same Cartesian plane. (1)

64.3 Determine the distance between the two x-intercepts of the two graphs. (1)

[15]

End of test

BERGVLIET HIGH SCHOOL

MATHEMATICS DEPARTMENT

NOVEMBER EXAM PAPER 2

GRADE 9
24 NOVEMBER
2025

MARKS: 75

TIME: 1 HOUR 30 MIN

SET BY: L. Roberts

MODERATOR: D. Viljoen

Name and Surname:_____

Teacher: Vi / Jo / Sc / El / Le / Li / Cp

QUESTION 1	QUESTION 2	QUESTION 3	QUESTION 4	TOTAL
16	**14**	**23**	**22**	**75**

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 4 questions.
2. Clearly show ALL calculations, diagrams, graphs, etc. that you have used in determining your answers.
3. Answers only will not necessarily be awarded full marks.
4. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
5. If necessary, round off answers to TWO decimal places, unless stated otherwise.
6. Diagrams are NOT necessarily drawn to scale.
7. Write neatly and legibly.

USEFUL FORMULAS

$C = 2\pi r$	$V = s^3$
$P = 2(l + b)$	$V = lbh$
$P = a + b + c$	$V = \pi r^2 h$
$A = s^2$	$TSA = s^2 + 2h.b$
$A = \frac{1}{2}bh$	$TSA = 2lb + 2lh + 2bh$
$A = lb$	$TSA = 2\pi r^2 + 2\pi rh$
$A = bh$	$TSA = 2\left(\frac{1}{2}bh\right) + ad + bd + cd$
$A = \pi r^2$	

QUESTION 1 : **Probability and data handling**

1.1 A dice is thrown 24 times, study the results below before answering the questions that follow:

3	2	3	1	3	1	3	5	3	4
5	3	1	2	6	2	3	4	4	2
2	6	1	5						

1.1.1 Complete the frequency and relative frequency table for the results above (3)

Number on dice	Tally	Frequency
1		
2		
3		
4		
5		
6		
Total		

1.1.2 What is the probability of rolling a 3? (2)

1.1.3 What is the relative frequency of rolling an odd number? (3)

1.2 Grade 9L wrote an informal math test. The following results were recorded of 10 learners in the class:

Learner number	Math Mark (%)	Learner number	Math Mark (%)
1	12%	6	90%
2	82%	7	27%
3	36%	8	55%
4	55%	9	60%
5	78%	10	86%

1.2.1 Calculate the mean mark (3)

1.2.2 Calculate the range of the math marks (1)

1.2.3 Identify the mode (1)

1.2.4 Determine the median mark (3)

[16]

QUESTION 2 : **Transformation geometry**

2.1 Point A (2;3) is reflected in the x-axis, give the co-ordinates of A' (2)

2.2 Point B (-4;2) is reflection about the line $y = x$, give the co-ordinates of B' (2)

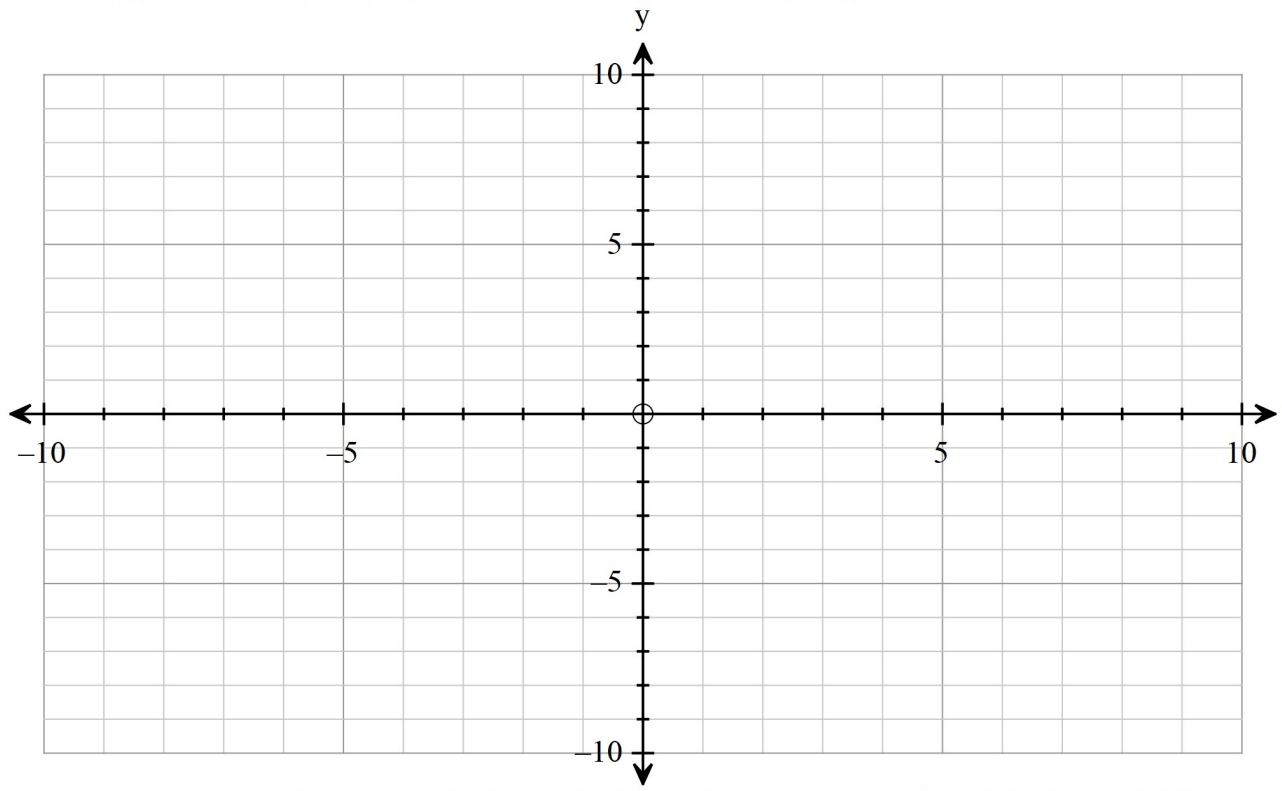
2.3 Plot and label the following points on the graph provided below. (3)

ΔCDE has points C(0;2), D(-2;0) and E(2;0) and is enlarged by a scale factor of 2. Label and plot the co-ordinates of ΔCDE and the enlarged triangle ΔC'D'E'

2.3.1 Describe the rule for the following transformation: $(x; y) \rightarrow (2x: 2y)$ (2)

2.4 Calculate the length of DE (2)

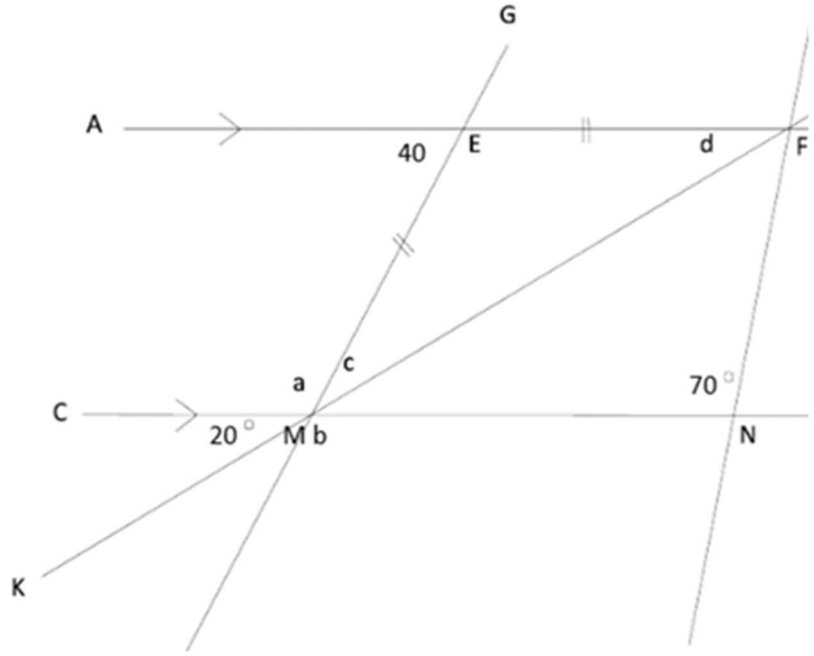
2.5 Calculate the area of ΔCDE (3)



[14]

<u>QUESTION 3</u> : **Straight Line Geometry**

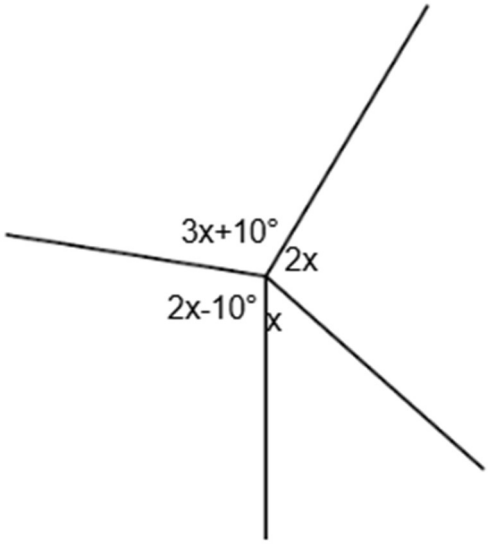
3.1 Study the diagram below and find the values of a, b, c and d (in this order) with reasons.



(8)

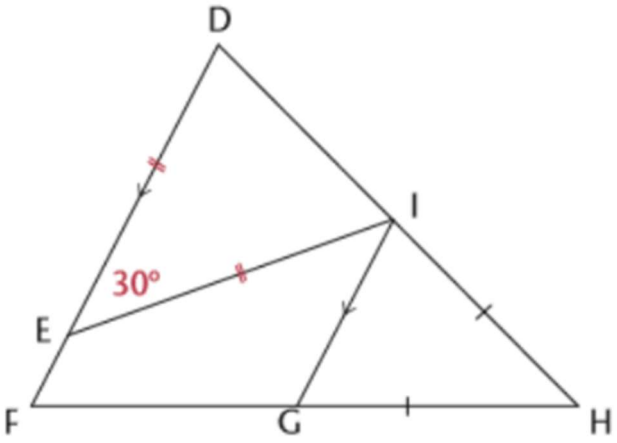
Statement	**Reason**

3.2 Solve for x in the diagram below by setting up an equation and solving it (4)



Statement	**Reason**

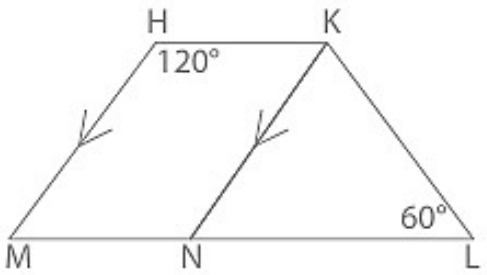
3.3 In the diagram DEI = 30º, DE = EI, DF ‖ IG, and GH = IH. Determine with reasons, the size of H.



(5)

Statement	Reason

3.4 HKLM is a trapezium with H = 120˚ and L = 60˚. A line KN is drawn so that it is parallel to HM. Prove that ▲KNL is an equilateral triangle.



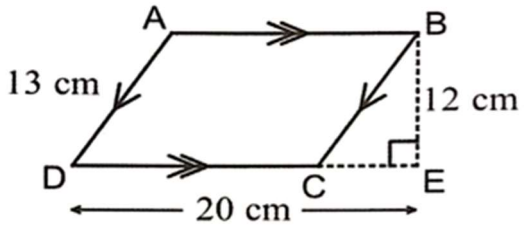
(6)

Statement	Reason

[23]

QUESTION 4 : **Pythagoras, Area, Perimeter and Total Surface Area**

4.1 Study the figure below and answer the questions that follow.



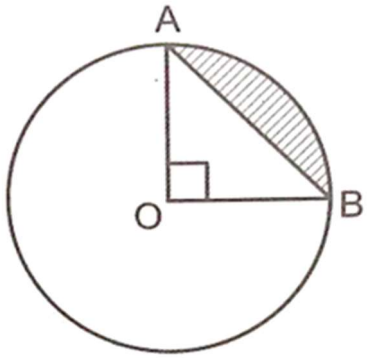
4.1.1 What type of quadrilateral ABCD? (1)

4.1.2 Name two pairs of parallel sides in the figure. (2)

4.1.3 What type of quadrilateral is ABED? (2)

4.1.4 Calculate the area of ABCD (5)

4.2 The sketch shows a circle with centre O. △ AOB is a right-angled triangle inside the circle. The circumference of the circle is 157,08 cm.

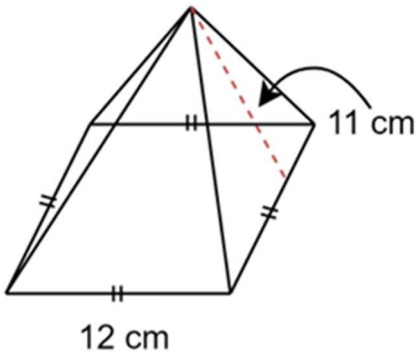


Calculate the following, correct to one decimal figure where necessary.

4.2.1 Show that the radius of the circle is 25 units (3)

4.2.2 The area of the shaded part (5)

4.3 Calculate the total surface area of the figure below, with a square base.



(4)

[22]

TOTAL: 75

BERGVLIET HIGH SCHOOL

MATHEMATICS DEPARTMENT

NOVEMBER EXAMINATION

GRADE 9

MATHEMATICS PAPER 2

21 November 2024

MARKS: 75

TIME: 90 MINUTES

SET BY: T Herbert

MODERATOR: D Viljoen

Name: _____

Teacher	Eb	Jo	Le	Si	Sm	Vi	Wh	Ws	(circle your teacher)
Class	B	E	R	G	V	L	I	T	(circle your class)

Question	1	2	3	4	5	Total
Mark obtained						
	/15	**/26**	**/8**	**/16**	**/10**	**/75**

INSTRUCTIONS AND INFORMATION

Read the following instructions carefully before answering the questions.

1. This question paper consists of 5 questions and 11 pages.
2. Answer ALL questions in this QUESTION PAPER provided.
3. Clearly show ALL calculations, diagrams, graphs, etc that you have used in determining your answers.
4. Answers only will NOT necessarily be awarded full marks.
5. You may use an approved scientific calculator (non-programmable and non-graphical), unless stated otherwise.
6. If necessary, round off answers to TWO decimal places, unless stated otherwise.
7. Diagrams are NOT necessarily drawn to scale.

Useful formulas.

$C = 2\pi r$	$V = s^3$
$P = 2(l + b)$	$V = lbh$
$P = a + b + c$	$V = \pi r^2 h$
$A = s^2$	$V = \frac{1}{2}bhd$
$A = \frac{1}{2}bh$	$TSA = 2lb + 2lh + 2bh$
$A = lb$	$TSA = 2(\frac{1}{2}bh) + ad + bd + cd$
$A = bh$	$TSA = 2\pi r^2 + 2\pi rh$
$A = \pi r^2$	

Question 1: Data handling and Probability

1.1 Given below are the marks, out of 50, for a Mathematics test written by a Grade 9 class at a particular school.

3	12	38	43
15	39	47	29
8	38	37	42
22	36	28	31
11	19	25	12

1.1.1 Complete the table using the data above. (3)

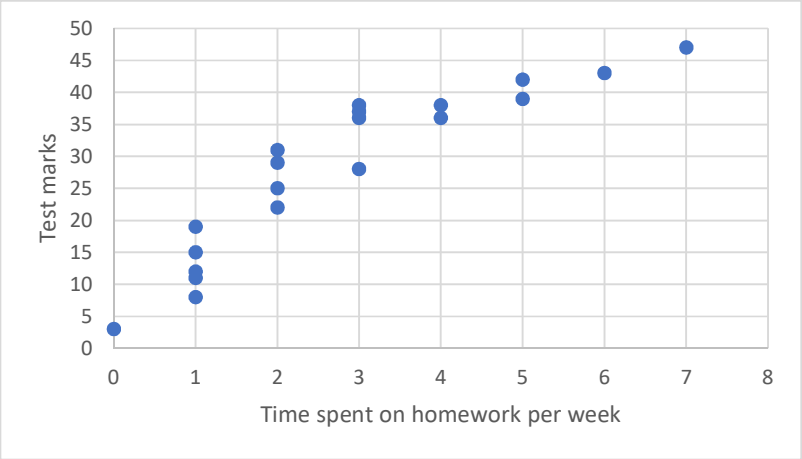
Marks	Tally	Frequency	Midpoint	Freq. x midpt.
$0 \leq x < 10$				
$10 \leq x < 20$				
$20 \leq x < 30$				
$30 \leq x < 40$				
$40 \leq x < 50$				
TOTAL				

1.1.2 Calculate the estimated mean of the grouped data set. (2)

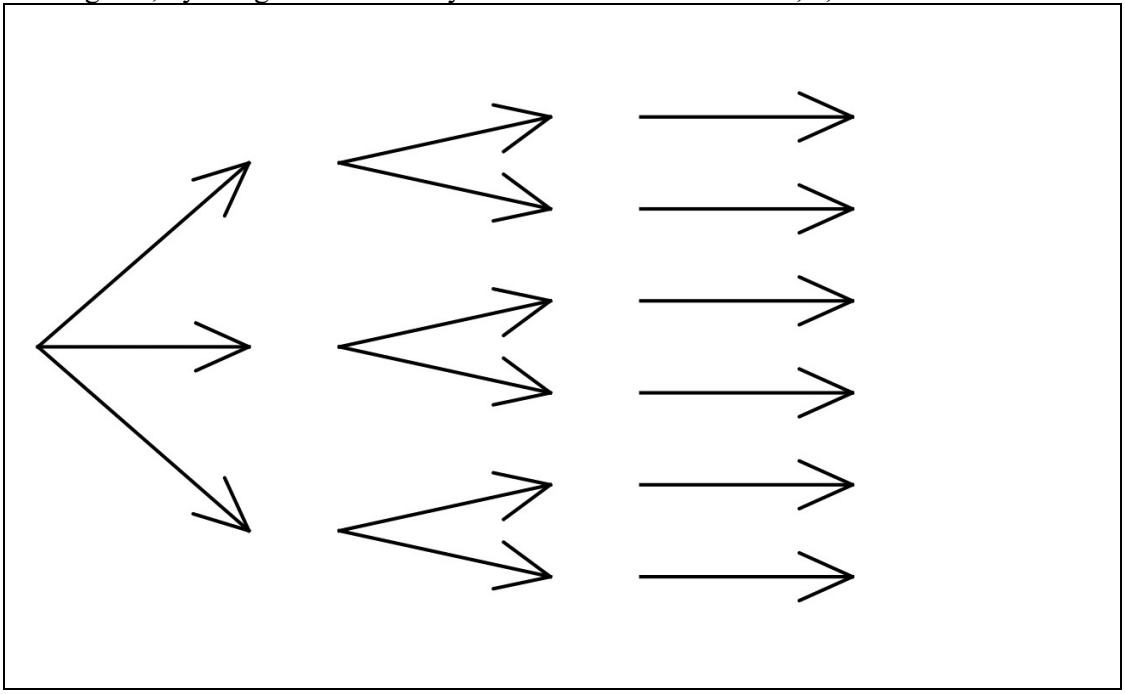
1.1.3 Determine the median interval of the grouped data set. (2)

1.1.4 What is the modal class of the data set? (1)

1.2 Given below is the correlation between the time the learners spent doing their homework each week (in hours), and the marks they obtained in the test. Describe the correlation. (2)



1.3 Complete the tree diagram to show all three-letter combinations that can be made from the letters given, by using each letter only once in the combination: **T,A,B** (3)



1.3.1 Write down the sample space. (1)

S = {_____ ; _____ ; _____ ; _____ ; _____ ; _____ }

1.3.2 What is the probability of selecting a combination that is a word in the English language? (1)

[15]

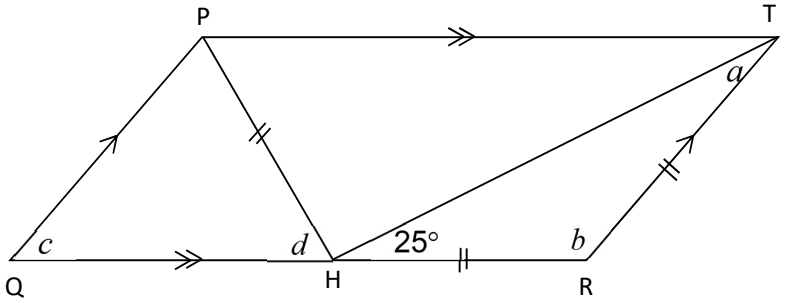
Question 2: 2D geometry

2.1 Match the following coumns. The first row is completed as an example. (5)

			Answer
1	Supplementary	A quadrilateral with two pairs of adjacent sides that are equal in length	5
2	The sum of the opposite interior angles	Lines that never intersect or cross one another on a plane and remain the same distance apart	
3	Parallel lines	Triangles are congruent	
4	90°	The exterior angle of a triangle is equal to…	
5	Kite	Sum to 180°	
6	AAA	The diagonals of a kite bisect at	
7	AAS		

Give reasons for all your answers.

2.2 Consider the shape below



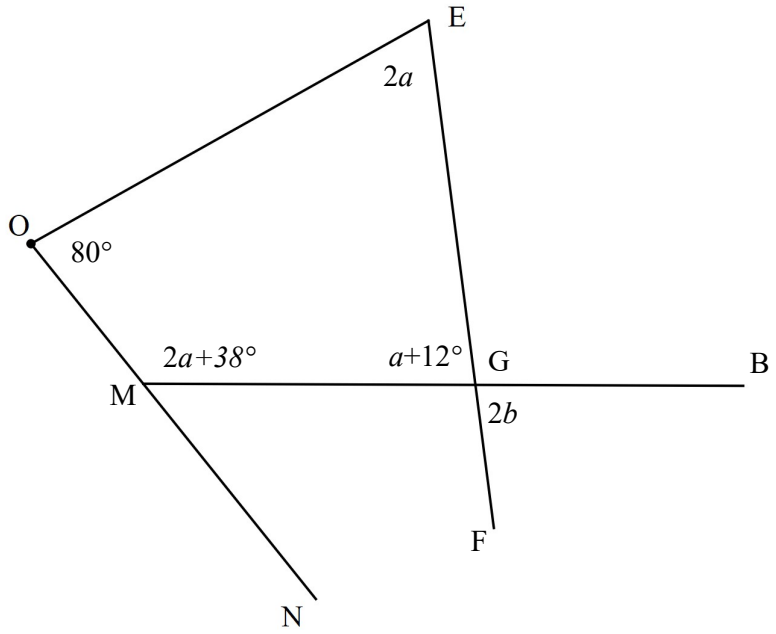
2.2.1 What type of quadrilateral is PQRT? (2)

Statement	Reason

2.2.2 Calculate the sizes of *a, b, c,* and *d.* (9)

Statement	Reason

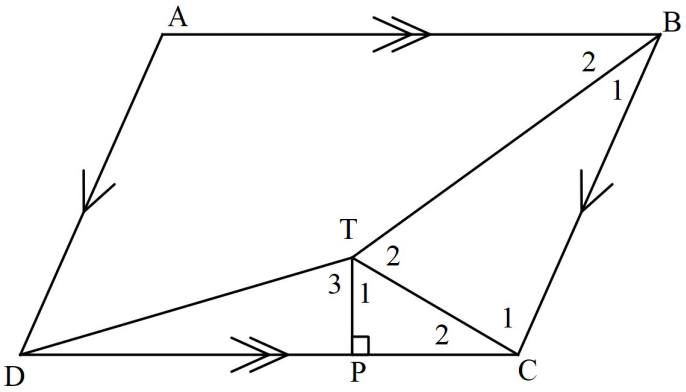
2.3 Calculate a and b in the figure below



Statement	Reason

(5)

2.4



The angle bisectors of $\hat{B}$ and $\hat{C}$ of parallelogram ABCD intersect at T.

Points B, T and D do not lie on a straight line. P is a point on DC such that $T\hat{P}C = 90°$.

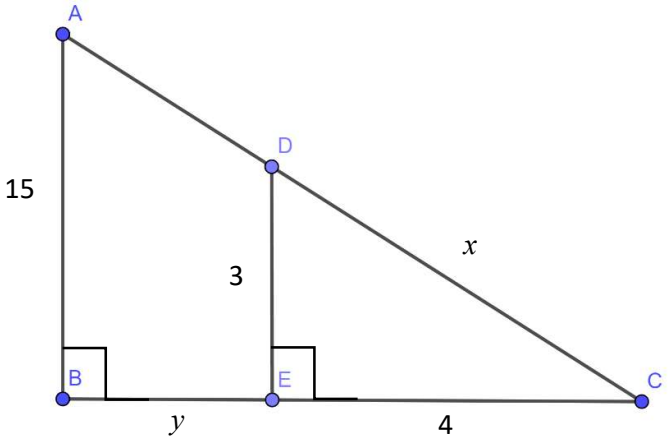
Prove that $\hat{T}_2 = 90°$

Statement	Reason

(5)

[26]

Question 3: Similarity and Proportion



3.1 Prove that ΔABC and ΔDEC are similar. (4)

Statement	Reason

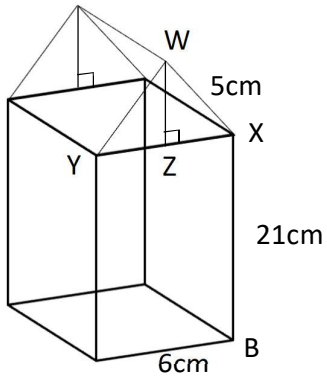
3.2 Hence, or otherwise, calculate the values of x and y. (4)

Statement	Reason

[8]

Question 4: Measurement

4.1 Consider the volume of the milk carton pictured. The base is a square with sides 6cm. Side XB is 21cm. The front facing triangle WYX is isosceles with hypotenuse 5cm.



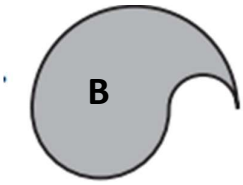
4.1.1 Calculate the height WZ, in triangle WYX. (3)

4.1.2 What is the total height of the carton? (1)

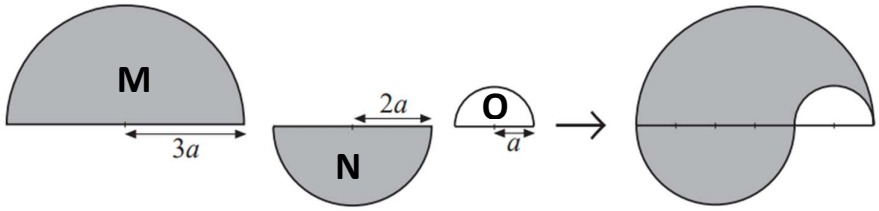
4.1.3 Calculate the total volume of the milk carton. (4)

4.1.4 Twelve milk cartons are packed into a crate 25cm tall, 18cm wide, and 24cm deep. How much empty space is in the crate when fully packed? (3)

4.2 This shape, labelled B, is designed using three semi-circles M,N, and O respectively.



The radii of the circles M,N and O, are 3a, 2a, and a respectively.

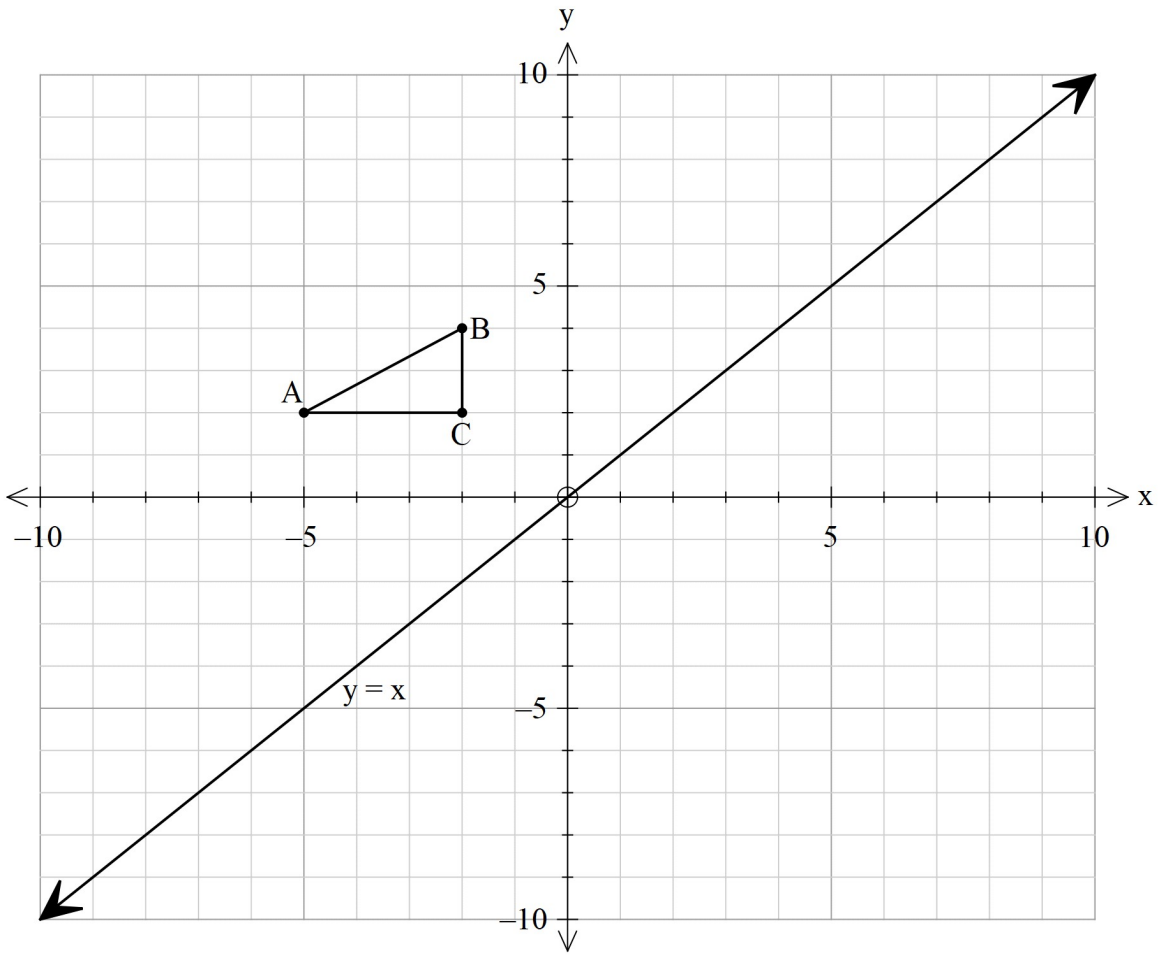


4.2.1 Calculate the area of each of the semi-circles M, N, O respectively in terms of a, and π. (3)

4.2.2 Determine the total area of the shape B in terms of a and π. (2)

[16]

Question 5: Transformation geometry



5.1 On the given set of axes is triangle ABC. The coordinates are A(-5,2); B(-2,4); C(-2,2).

5.1.1 Triangle ABC is reflected about the line y=x to form its image A'B'C'. Draw and label this image on the given set of axes. (3)

5.1.2 Triangle ABC is translated using the following rule $(x, y) \rightarrow (x + 2; y - 2)$. (3)
Complete the algebraic rule below.

A (-5, 2) →	P(_____;_____)
B (-2, 4) →	Q(_____;_____)
C (-2, 2) →	R(_____;_____)

5.1.3 Following the translation of 5.1.2, the triangle PQR is then enlarged by a factor of 3 to form its new image P'Q'R'. Draw and label the image on the given set of axes above. (3)

5.1.4 Calculate the following ratio (1)
Area ΔABC : Area ΔA'B'C : Area ΔP'Q'R'

[10]

Additional working space. Make sure to number the questions answered here.



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

NATIONAL ASSESSMENT
GENERAL EDUCATION CERTIFICATE (GEC)

2023 GRADE 9 PILOT STUDY

Subject: Mathematics

Paper: 2

Marks: 75

Duration: 120 Minutes

excluding 15 minutes reading time

This test consists of 24 pages, excluding the cover page.

Instructions to the learner:

1. You will receive 15 minutes reading time before you begin answering this test.
2. Read all the instructions and questions carefully.
3. Answer all questions.
4. Use the provided answer sheet to write all your answers.
5. Do your calculations before choosing the correct answer in Section A.
6. ALL calculations must be shown in Section B.
7. Non-programmable scientific calculators may be used, unless you are told not to do so in some questions.
8. Diagrams are not necessarily drawn to scale, all lines are regarded as straight lines unless otherwise stated.

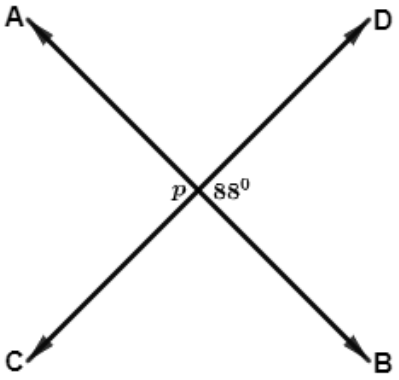
This test starts on the next page.



Do not start to write until you are told to do so.

SECTION A

1.



Lines AB and CD are straight lines.

Why is $p = 88^\circ$?

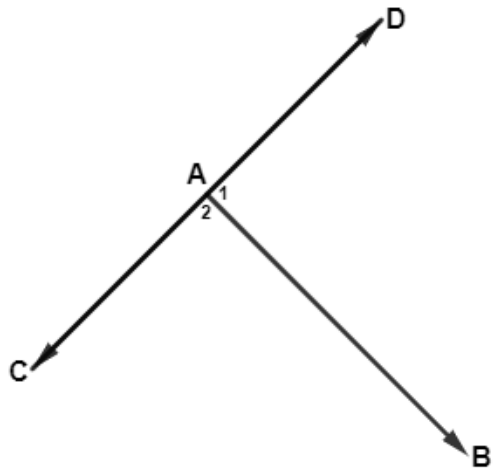
A It is adjacent to 88°.

B It alternates with 88°.

C It is vertically opposite to 88°.

D It corresponds with 88°. (1)

2.



AB⊥CD

What is the size of $\hat{A}_1$?

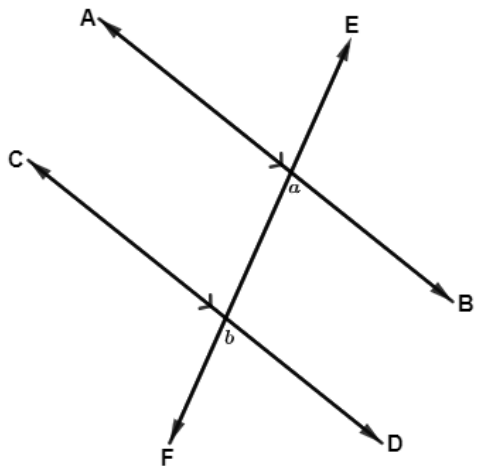
A 270°

B 180°

C 45°

D 90° (1)

3.



What is the relationship between angles marked a and b?

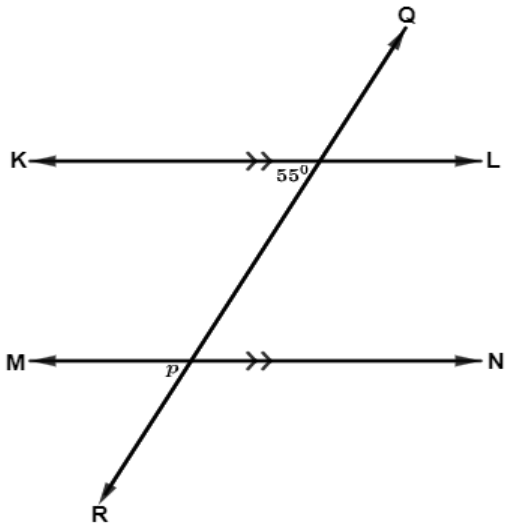
A Complementary angles.

B Co-interior angles.

C Corresponding angles.

D Alternate angles. (1)

4.



What is the value of p?

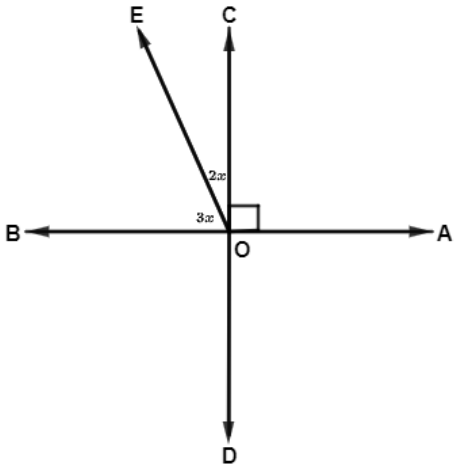
A $125°$

B $55°$

C $145°$

D $35°$ (1)

5.



What is the size of E$\hat{O}$B?

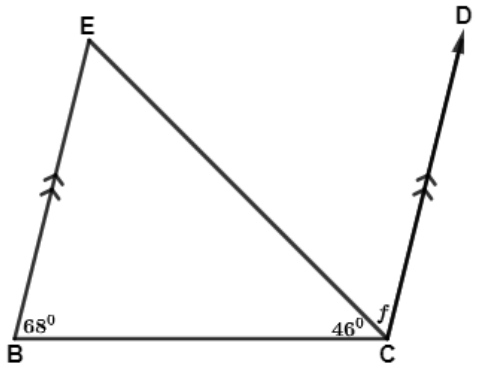
A $54°$

B $90°$

C $18°$

D $36°$ (1)

6.



What is the value of f?

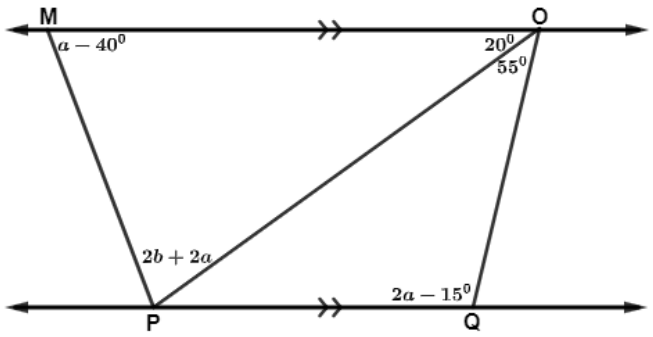
A $68°$

B $66°$

C $46°$

D $44°$ (1)

7.



What is the value of b?

A $10°$

B $20°$

C $40°$

D $60°$ (1)

8. A right-angled triangle is a triangle with …

A one right angle and two acute angles.

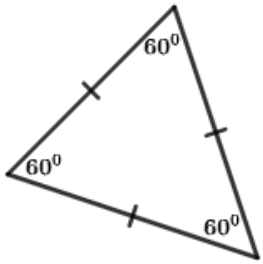
B one right angle and two obtuse angles.

C one right angle, one reflex angle and one acute angle.

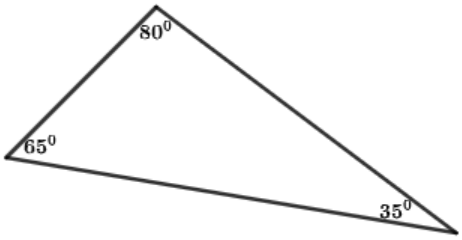
D one right angle, one reflex angle and one obtuse angle. (1)

9. Which one of the following triangles is an equilateral triangle?

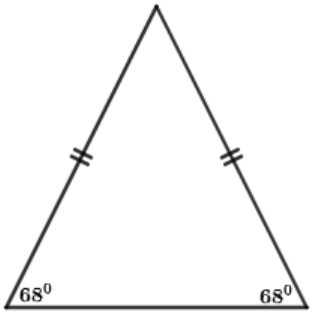
A



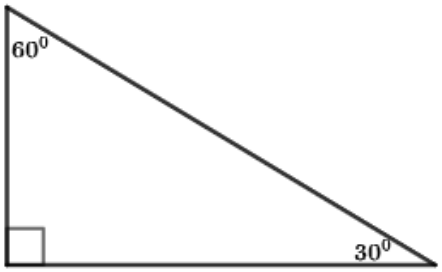
C



B



D



(1)

10. Which one of the following statements best describes a kite?

A The diagonals are perpendicular, one diagonal bisects the other diagonal and one diagonal bisects the angles at the vertices.

B The diagonals are perpendicular and bisect each other, bisect the angles at the vertices.

C The diagonals are perpendicular and bisect each other.

D The diagonals are perpendicular and do not bisect the angles at the vertices. (1)

11. Which one of the following statements is true for a square?

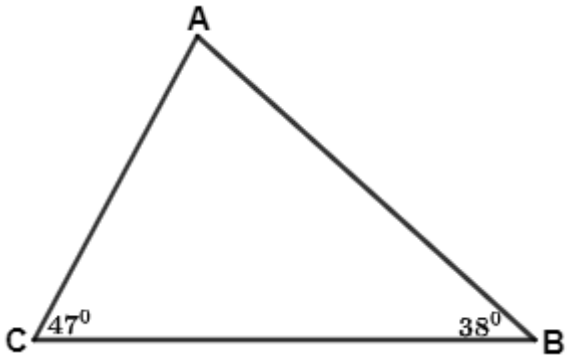
A A square is a trapezium.

B A rectangle is a square.

C A rhombus is a square.

D A square is a rectangle. (1)

12.



What is the size of $\hat{A}$?

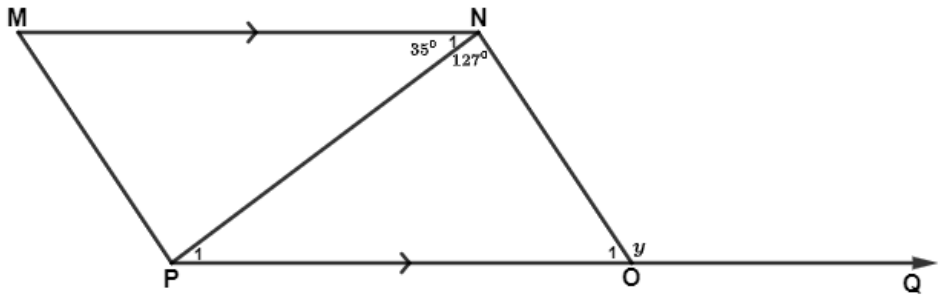
A $85°$

B $95°$

C $47°$

D $38°$ (1)

13.



MN ‖ PQ

What is the value of y?

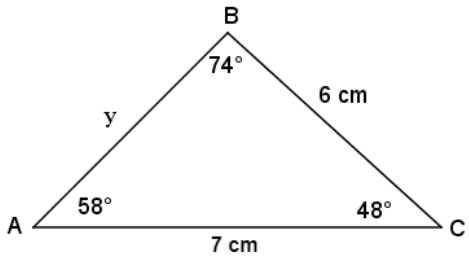
A $162°$

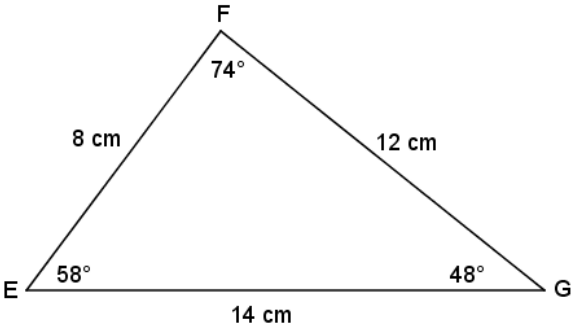
B $92°$

C $127°$

D $35°$ (1)

14.





What is the length of side AB?

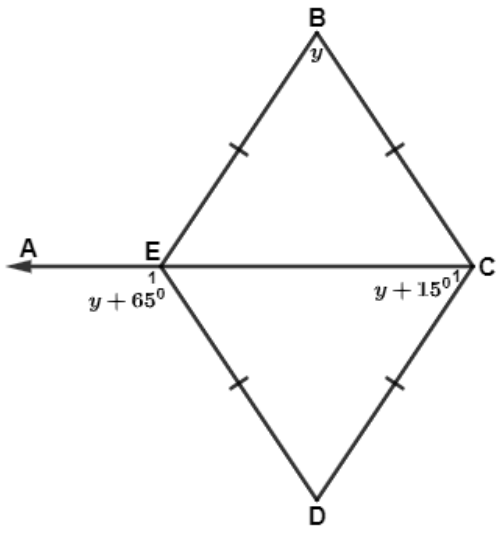
A 4 cm

B 8 cm

C 6 cm

D 7 cm (1)

15.



AEC is a straight line.

What is the size of $\hat{E}_1$?

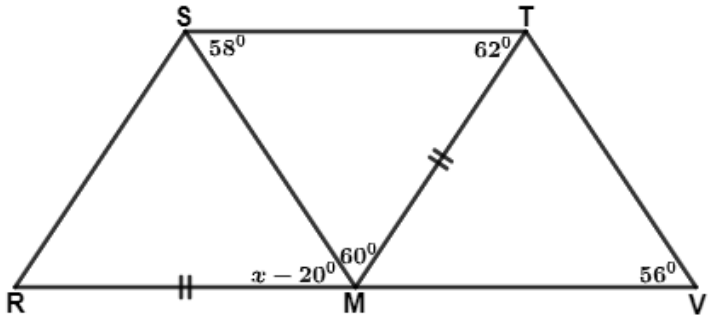
A $115°$

B $180°$

C $50°$

D $65°$ (1)

16.



Δ RMS $\equiv \Delta$ TMS

What is the value of x?

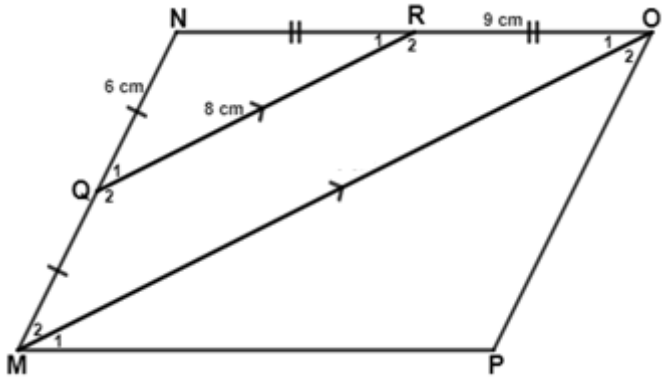
A $80°$

B $78°$

C $76°$

D $82°$ (1)

17.



MNOP is a parallelogram and QR ∥ MO.

What is the length of MO?

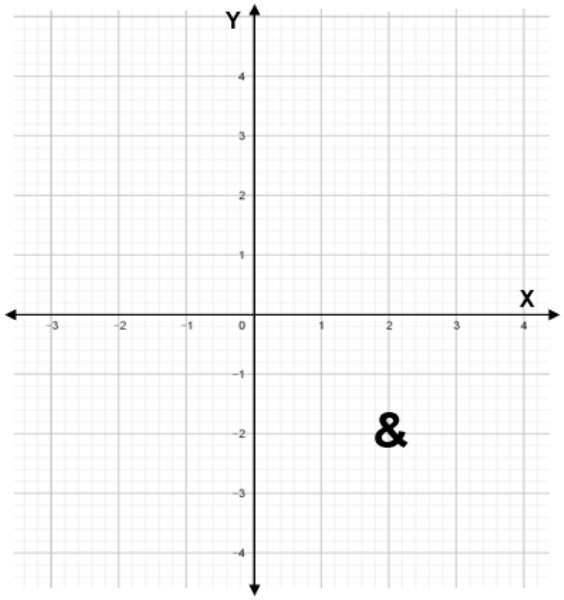
A 15 cm

B 13 cm

C 11 cm

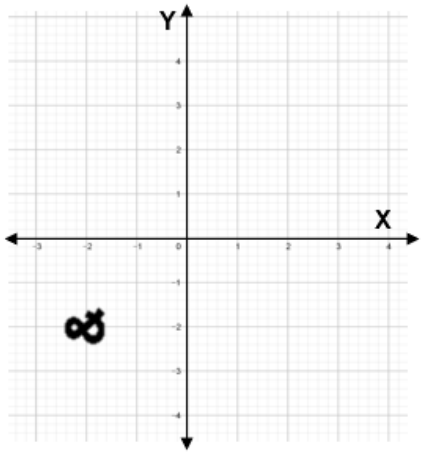
D 16 cm (1)

18.

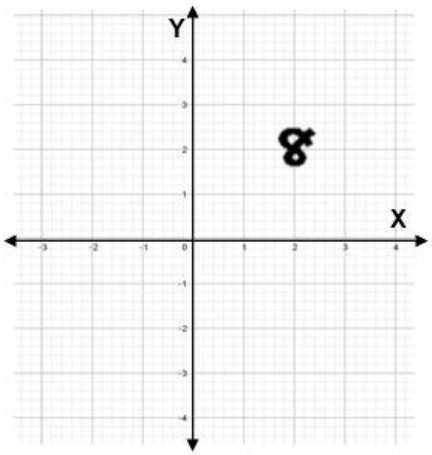


Which one of the following transformations represents reflection in the X-axis?

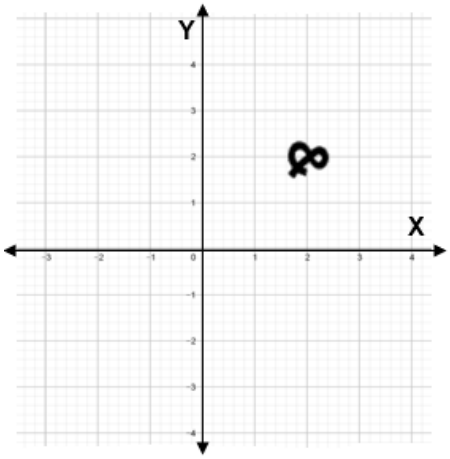
A



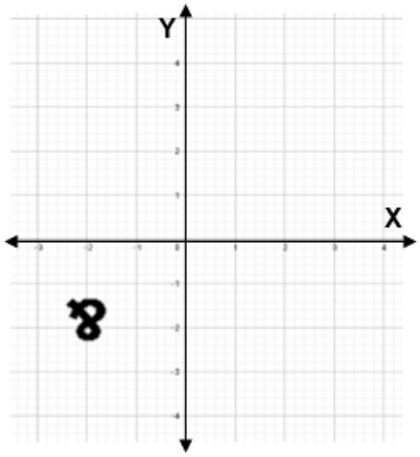
C



B

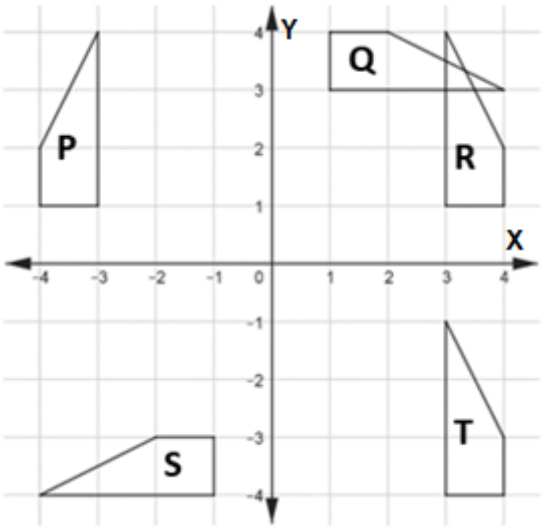


D



(1)

19.



Which two shapes are reflections of each other in the line $y = x$?

A P and R

B S and T

C R and T

D Q and R (1)

20. $P(3\,;\,-1) \rightarrow P'(1\,;\,3)$

Describe the rule used to transform P to its image P′.

A Translated 2 units to up and 4 units to the left.

B Translated 4 units to the left and 2 units up.

C Translated 2 units to the left and 4 units up.

D Translated 4 units up and 2 units to the left. (1)

21. $P'(-2\,;\,-7)$ is the reflection of P in the X-axis.

What are the co-ordinates of P?

A $P(-2\,;\,7)$

B $P(2\,;\,-7)$

C $P(7\,;\,-2)$

D $P(-7{:}\,2)$ (1)

22. What are the co-ordinates of the image of Q$(3\ ;\ -5\ )$ when it is reflected in the X-axis and translated 2 units to the left?

A Q′$(-3\ ;\ -7)$
B Q′$(1\ ;\ -5)$
C Q′$(1\ ;\ 5)$
D Q′$(-5\ ;\ 7)$ (1)

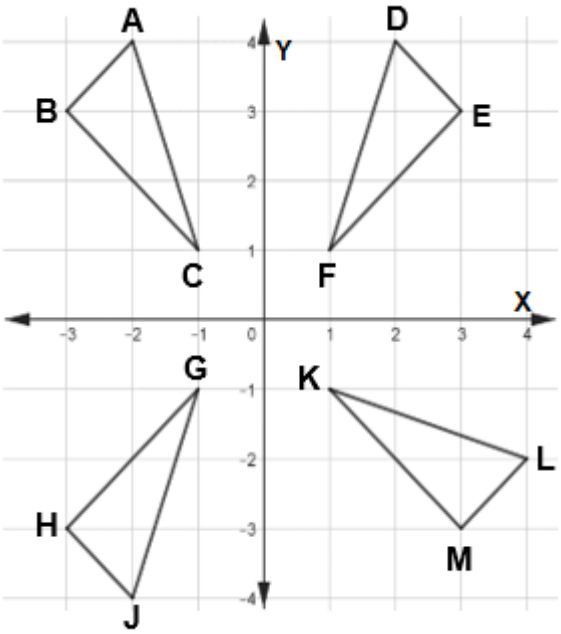
23. Point $(x; y)$ is reflected in the Y-axis and translated 1 unit downwards.
What is the rule used to transform point $(x; y)$?

A $(x; y) \rightarrow (x - 1\ ;\ y)$
B $(x; y) \rightarrow (-x\ ;\ y - 1)$
C $(\ x; y) \rightarrow (-x\ ;\ y)$
D $(x; y) \rightarrow (-x\ ; -y)$ (1)

24. Line AB with A$(-5; 9)$ and B$(1; 2)$ is reflected in the line $y = x$.
What are the co-ordinates of A′ and B′?

A A′$(9\ ;\ 5)$ and B′$(2\ \ ;\ -1)$
B A′$(-5\ ;\ 9)$ and B′$(2\ ;1)$
C A′$(5\ ;\ -9)$ and B′$(-1\ ;\ -2)$
D A′$(9\ ;\ -5)$ and B′$(2\ ;\ 1)$ (1)

25.



X$(-2\,;4)$; Y$(-3;3)$and Z$(-1\,;1)$ are coordinates of ΔXYZ.

Which triangle represents the reflection of ΔXYZ in the line $y = x$?

A ΔABC

B ΔDEF

C ΔGHI

D ΔKLM (1)

26. Triangle ABC is an equilateral triangle with AB $=$ 5 cm.

What is the perimeter of triangle ABC?

A 25 cm^2

B 15 cm

C 25 cm

D 15 cm^3 (1)

27. PQRS is a rectangle.

What is the formula to calculate the area of PQRS?

A $A = \frac{1}{2}bh$

B $A = lb$

C $A = l + b$

D $A = 2(l + b)$ (1)

28. $2\pi r$ is used to calculate …

A the area of a circle.

B the perimeter of a circle.

C the radius of a circle.

D the diameter of a circle. (1)

29. What is the formula to calculate the area of a circle?

A $A = 2\pi r^2$

B $A = \pi^2 r$

C $A = 2\pi r$

D $A = \pi r^2$ (1)

30. A circle has an area of 198 cm^2.

What is the diameter, rounded off to TWO decimal places?

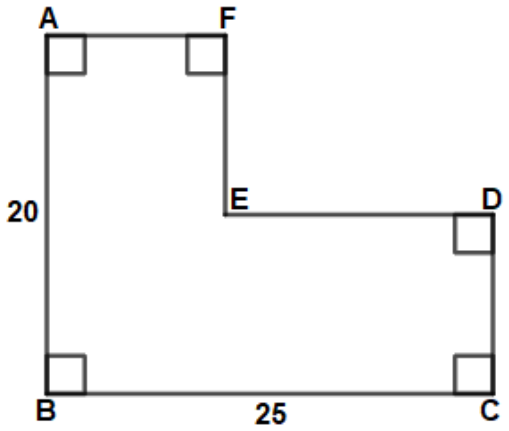
A 63,05 cm

B 15,88 cm

C 12,92 cm

D 31,53 cm (1)

31.



What is the perimeter of the figure ABCDEF?

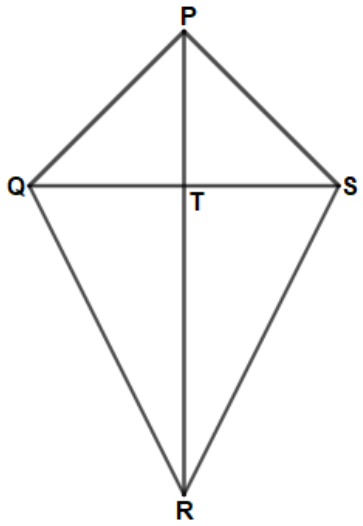
A 65

B 70

C 45

D 90 (1)

32.



PQRS is a kite with PR = 16 cm and TS = 30 mm.

What is the area of the kite?

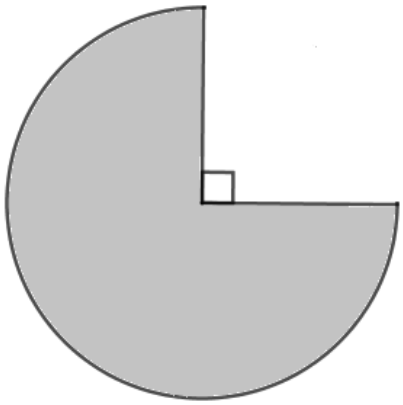
A 11 cm^2

B 24 cm^2

C 48 cm^2

D 96 cm^2 (1)

33.



The diagram represents three quarters of a circle.

The diameter of the circle is 30 cm.
What is the area of the shaded part (rounded off to the nearest whole number)?

A 177 cm^2

B 530 cm^2

C 617 cm^2

D 707 cm^2 (1)

34. DEFG is a rhombus with diagonals DF $= 6x$ cm and EG $= 0{,}08x$ m.

What is the perimeter of rhombus DEFG in terms of x (rounded off to the nearest whole number)?

A $12x$ cm

B $20x$ cm

C $14x$ cm

D $11x$ cm (1)

35. The wheel of the toy car has a diameter of 5 cm.

How many times will the wheel turn if the car covers 2 m (rounded off to the nearest whole number)?

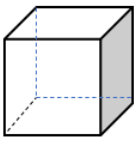
A 7 times

B 8 times

C 10 times

D 13 times (1)

36.



The volume of a cube is 64 cm^3.

What is the length of a side of the cube in mm?

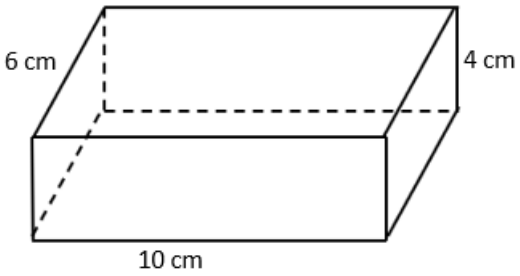
A 0,04 mm

B 400 mm

C 40 mm

D 0,4 mm (1)

37.



What is the surface area of the rectangular prism?

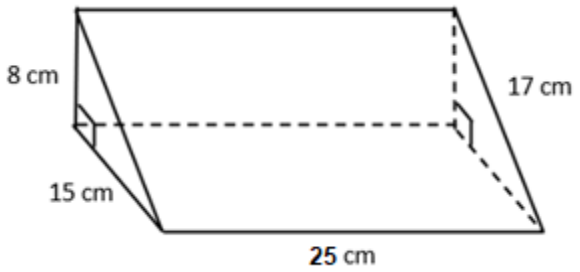
A 328 cm^2

B 240 cm^2

C 124 cm^2

D 248 cm^2 (1)

38.



What is the surface area of the prism?

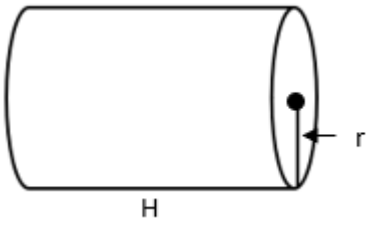
A 1120 cm^2

B 1060 cm^2

C 745 cm^2

D 831 cm^2 (1)

39.



Which formula is used to determine the surface area of the cylinder?

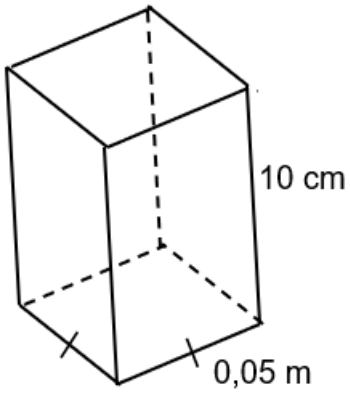
A $\text{SA} = \pi r^2 + 2\pi rH$

B $\text{SA} = 2\pi r^2 + 2\pi rH$

C $\text{SA} = 2\pi r + \pi rH$

D $\text{SA} = 2\pi r + 2\pi rH$ (1)

40.



The square-based prism has a side of 0,05 m and a height of 10 cm.
What is the volume in cm^3?

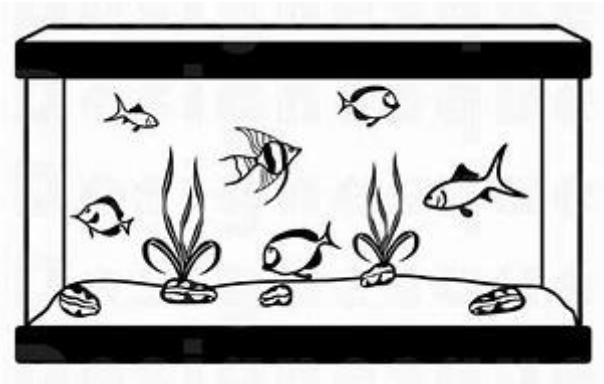
A $0{,}025\ cm^3$

B $125\ cm^3$

C $250\ cm^3$

D $2{,}50\ cm^3$ (1)

41.



The inside measurement of a fish tank is 90 cm by 400 mm by 600 mm.
What is the capacity of the tank?

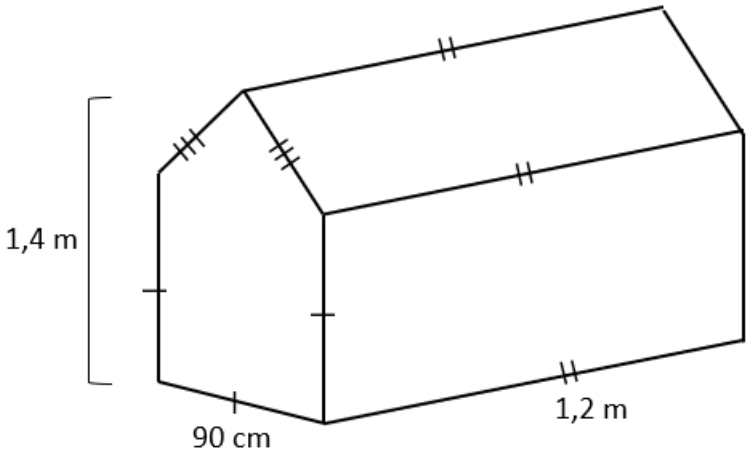
A 216 000 litre

B 216 litre

C $216\ cm^3$

D $216\ 000\ cm^3$ (1)

42.



The height of the dog kennel is 1,4 m high.

Determine the volume of the dog kennel in m^3.

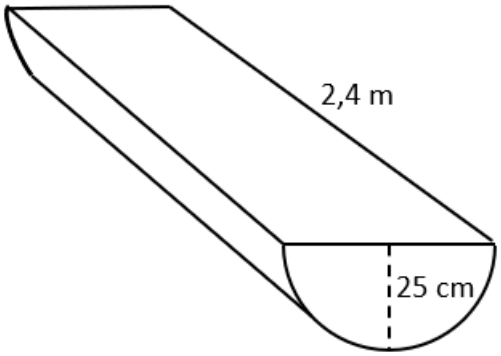
A 1,197 m^3

B 1,242 m^3

C 100,35 m^3

D 127,68 m^3 (1)

43.



What is the surface area of this half cylinder?

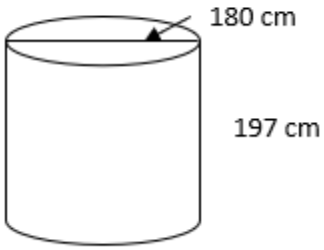
A 3,28 m^2

B 8,20 m^2

C 244,08 m^2

D 128,24 m^2 (1)

44.





The height of the water tank is 197 cm and the diameter is 180 cm.
After some heavy rains, the water lies at the 450 l mark in the tank.

What percentage of the tank will be filled with water?

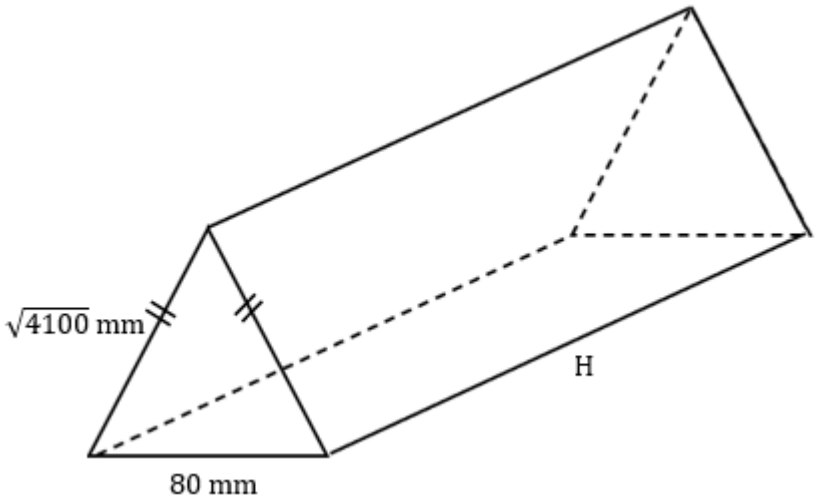
A 4,04%

B 8,98%

C 0,81%

D 24,76% (1)

45.



A cardboard container can hold 300 ml of chocolate milkshake.

What is the height of the container as shown above?

A 150 cm

B 150 mm

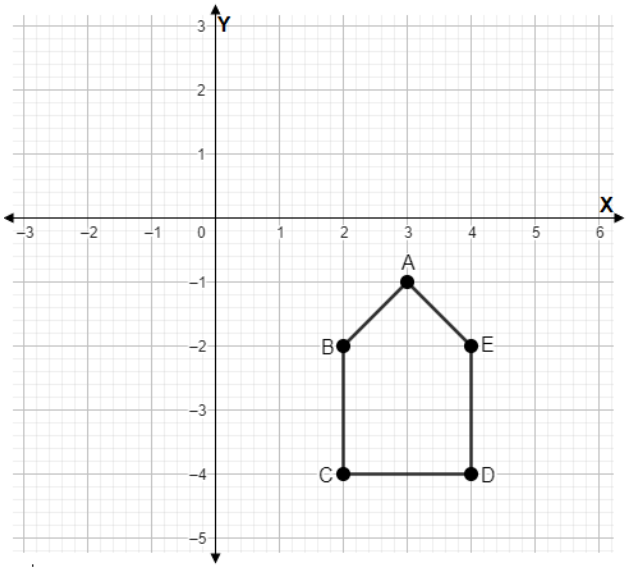
C 9,9 mm

D 1,5 cm (1)

[45]

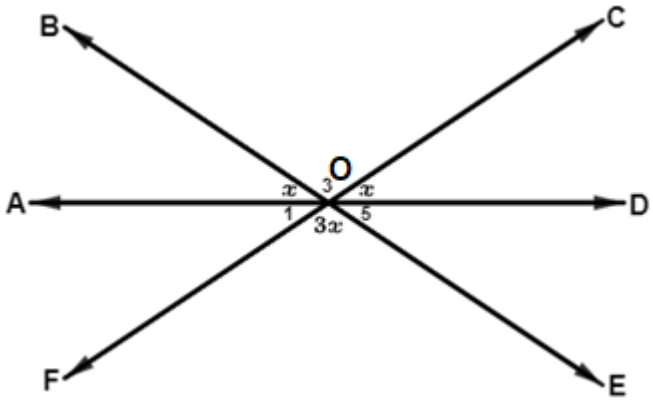
SECTION B

46.



Translate the polygon five units to the left and one unit up. (3)

47.



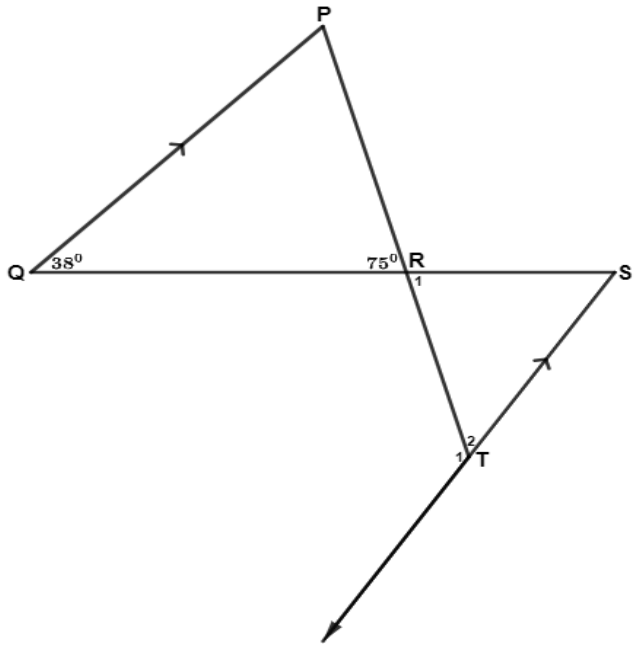
Straight lines AD, BE and CF intersect at O.

What is the value of x? (4)

48. The area of a triangle is 100 cm^2 and its base is 40 mm.

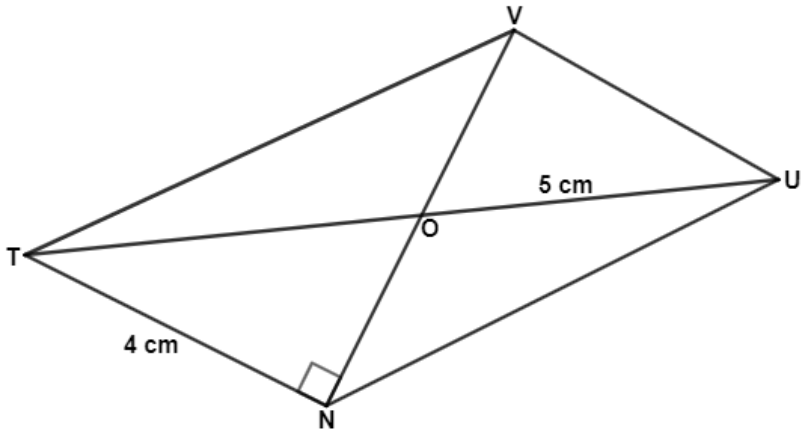
What is the perpendicular height of the triangle? (3)

49.



What is the size of $\hat{T}_1$? (5)

50.



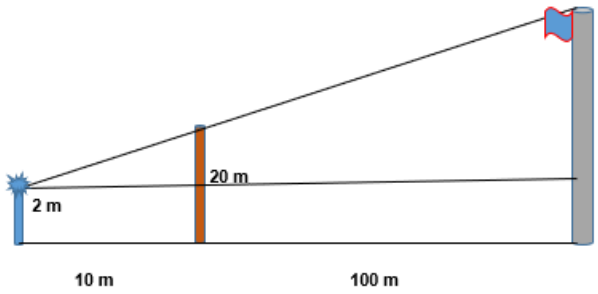
TVUN is a parallelogram.

What is the length of ON? (5)

51. A company stores boxes in a room with a length of 5 m, breadth of 3 m and height of 2 m.

How many boxes can fit in this room if each box is 10 cm long, 6 cm wide and 4 cm high? (4)

52.



A grade 9 class wants to determine the height of the school's flag pole from the ground.
They use a laser light source mounted on a structure with height 2 m from the ground, to shine light over the wooden beam.
The light shines over the 20 m high wooden beam to the top of the flag pole.
The distance between the flag pole and the wooden beam is 100 m.
The distance between the wooden beam and the light source structure is 10 m.

Determine the height of the flag pole. (6)

[30]

End of test