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)

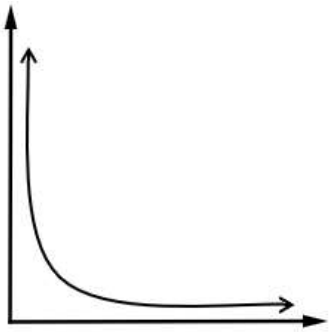
2. Given: 12; 18 and 27.
   What is the LCM of the numbers?

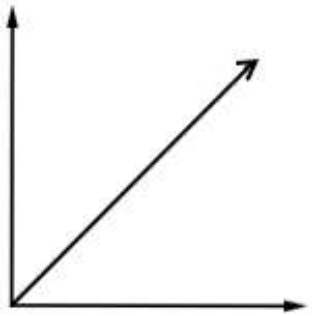
   A 144
   B 108
   C 72
   D 54 (1)

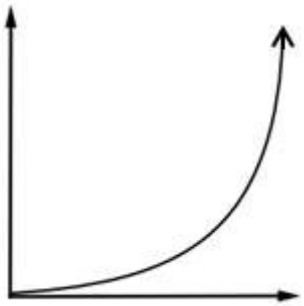
3. Given: $\frac{8}{30}$ and $\frac{12}{36}$.
   What is the HCF of the numbers?

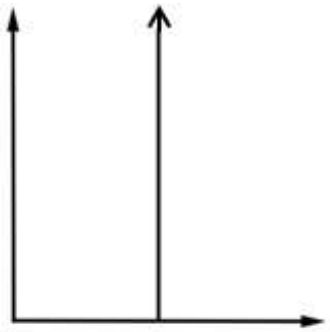
   A $\frac{2}{3}$
   B $\frac{2}{6}$
   C $\frac{1}{6}$
   D $\frac{4}{3}$ (1)

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?

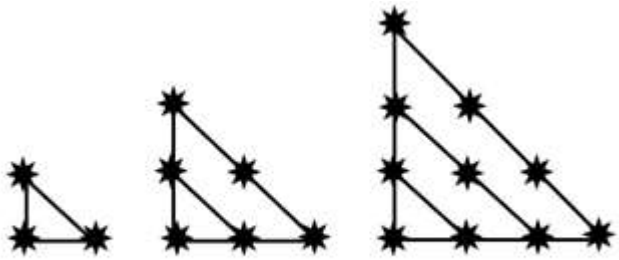
A 33

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?

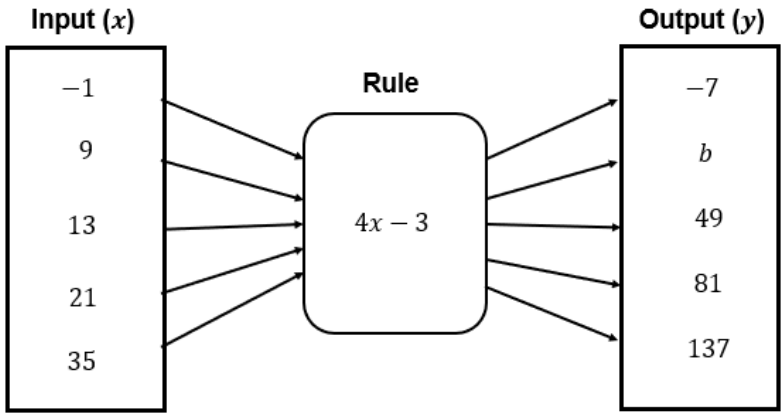
A 1 m

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?

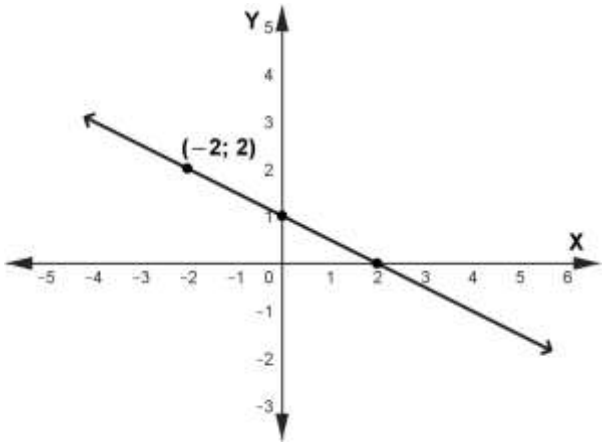
A $m = 5n + \frac{n}{2}$

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 $V = 4t + 41$

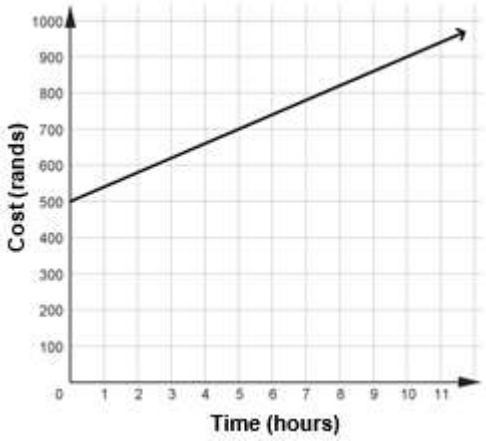
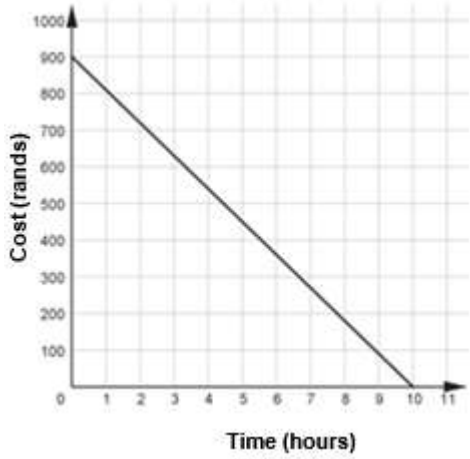
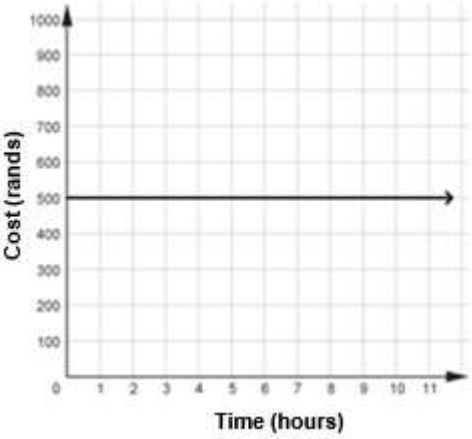
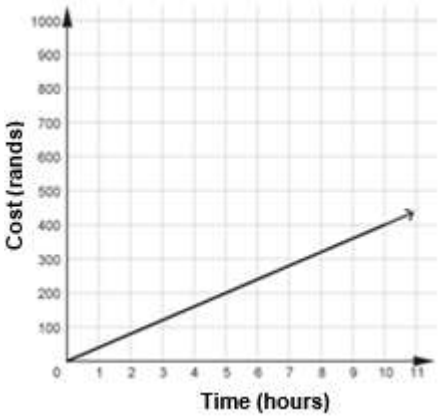
B $V = 4t + 10$

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?

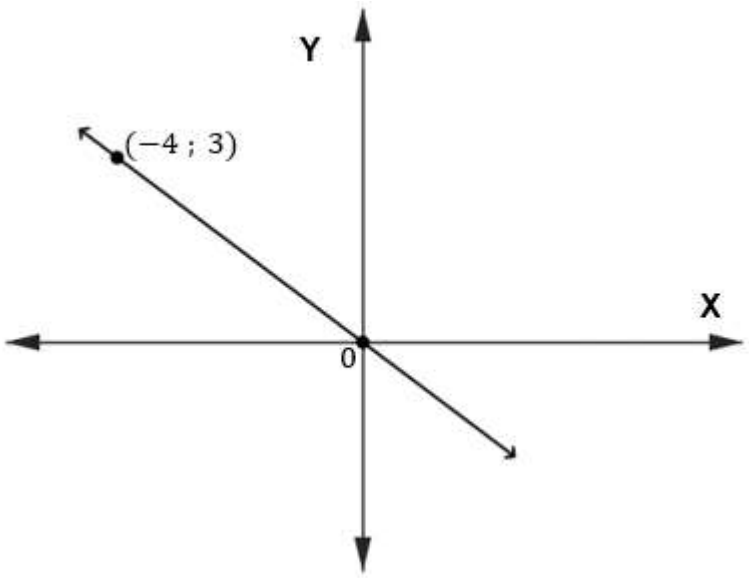
A -2

B 2

C -1

D 1 (1)

55.



What is the gradient of the line?

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

B $\frac{4}{3}$

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

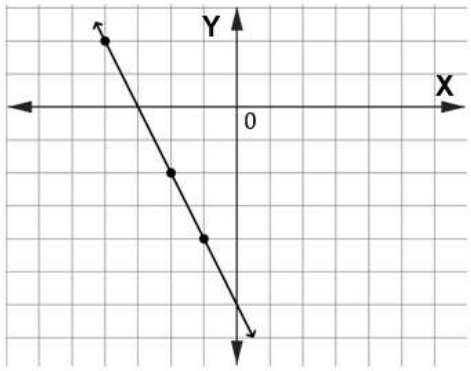
D $\frac{3}{4}$ (1)

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

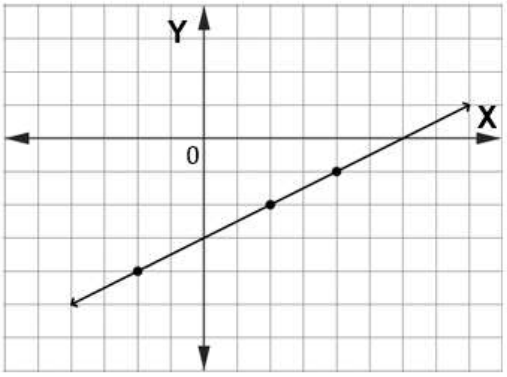
x	-4	-2	2
y	-1	-2	-4

Which graph represents the ordered pairs?

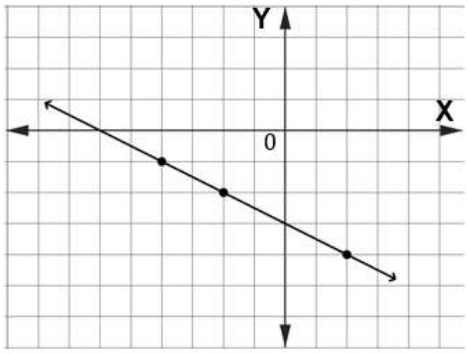
A



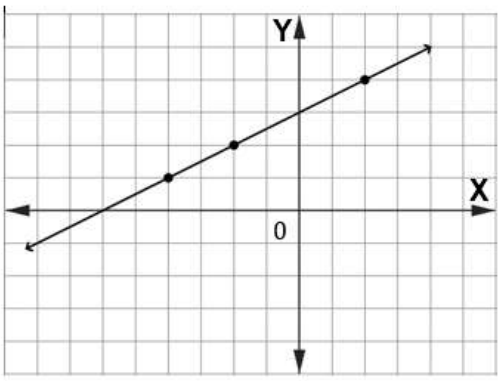
C



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

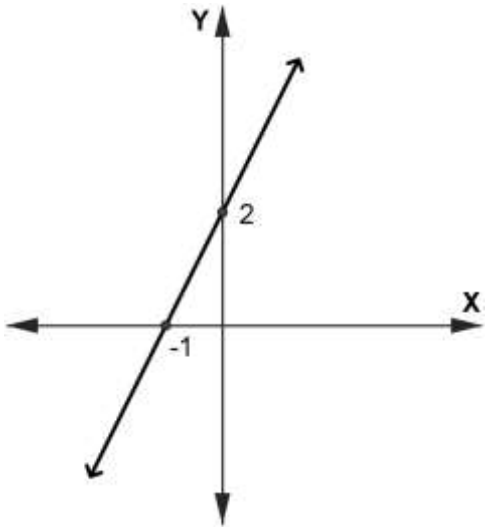
x	1	2	3	4
y	12	20	28	36

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?

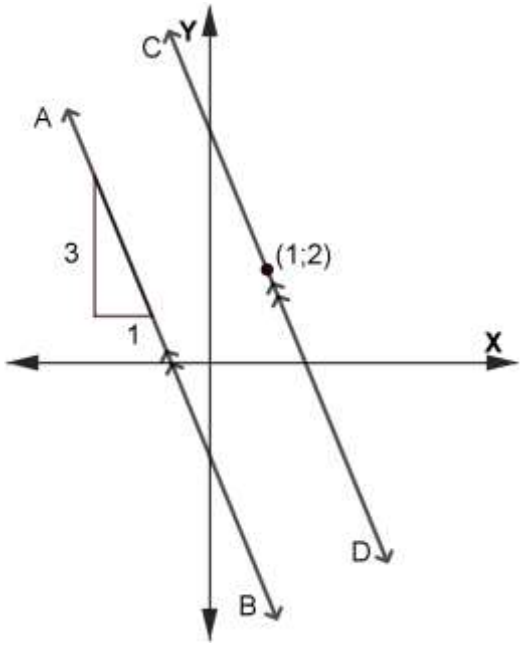
A $(-2; 3)$

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