

Coordinate Geometry Test Non Calculator

Year

9

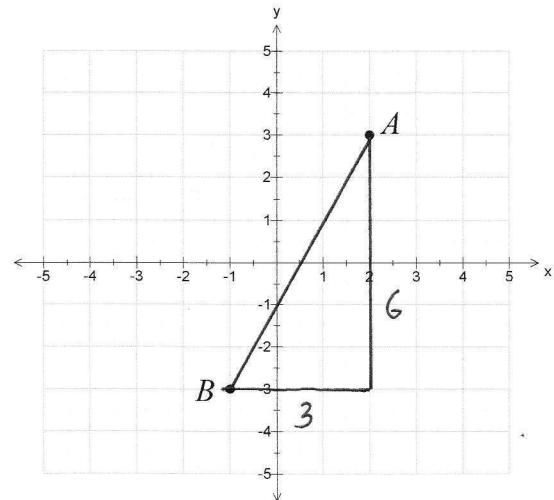
Short Answer Section

Name : _____

Write all working and answers in the spaces provided on this test paper.

1. What is the gradient of the line joining A (2, 3) and B (-1, -3).

$$\text{Gradient} = \frac{6}{3} = 2$$



2. Which point, P or R, is closest to the origin O. What is its distance from O correct to one decimal place?

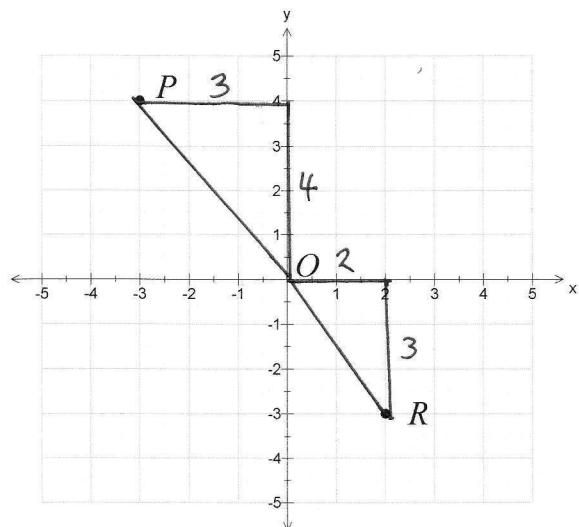
$$OP^2 = 3^2 + 4^2$$

$$OP = \sqrt{25} = 5$$

$$OR^2 = 2^2 + 3^2$$

$$OR = \sqrt{13} \approx 3.6$$

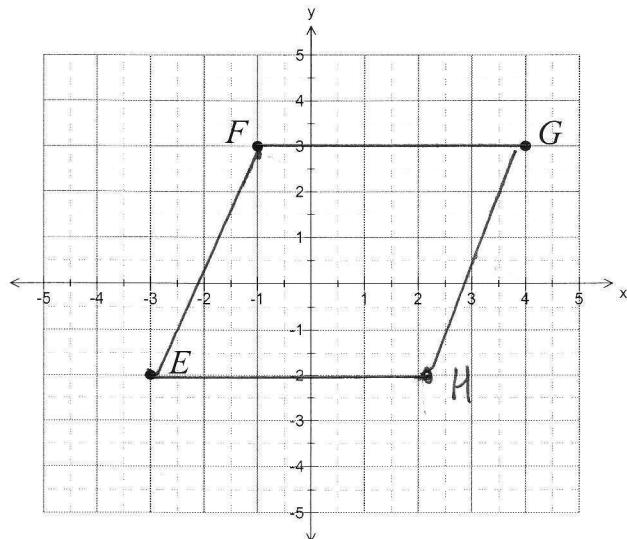
P is closest to O.



Coordinate Geometry Test

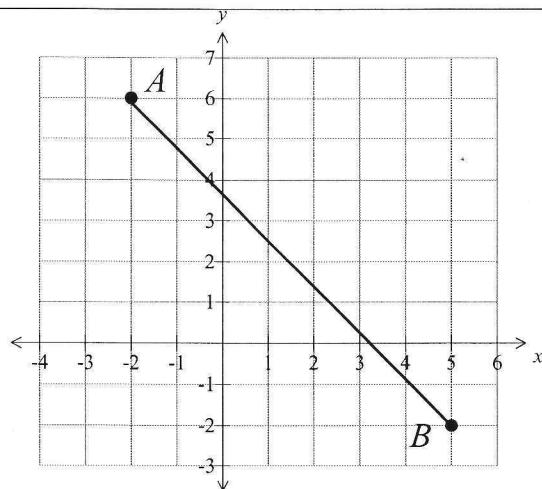
3. A parallelogram has vertices at E, F, G and H.
What are the coordinates of H?

.....
.....
.....
H is (2, -2)



4. What is the length of the line segment joining A(-2, 6) and B(5, -2), shown?

.....
 $AB^2 = 7^2 + 8^2$
.....
 $= 49 + 64$
.....
 $AB = \sqrt{113}$



5. What is the gradient of the line whose equation is $y = 5 - 3x$?

.....
Gradient = -3
.....

6. Calculate the midpoint of the line segment AB, where A is (2, -5) and B is (7, -9).

.....
Midpoint = $\left(\frac{2+7}{2}, \frac{-5+(-9)}{2} \right) = (4.5, -7)$

7. Which of the points L(-2, 2), M(5, -2) or N(7, -3) lies on the line with equation $y = 4 - x$?

.....
 $(-2, 2) \quad y = 4 - (-2) \quad (5, -2) \quad y = 4 - 5 \quad (7, -3) \quad y = 4 - 7$
.....
 $= 6 \quad \text{No} \quad = -1 \quad \text{No} \quad = -3 \quad \text{YES}$

N(7, -3) lies on the line

Coordinate Geometry Test

8. What is the length of the interval joining the points (-4, 7) and (8, 2)?

$$d = \sqrt{(-4-8)^2 + (7-2)^2}$$

$$= \sqrt{144+25}$$

$$= \sqrt{169} = 13 \text{ units}$$

9. What is the gradient of the interval joining the points (6, -7) and (1, 3)?

$$m = \frac{-7-3}{6-1}$$

$$= \frac{-10}{5} = -2$$

10. What is the equation of the line which has a gradient of -2 and which passes through the point (3, -2)?

$$y - y_1 = m(x - x_1)$$

$$y + 2 = -2(x - 3)$$

$$y + 2 = -2x + 6$$

$$y = -2x + 4$$

$$\text{OR } y = mx + b \quad -2 = -2(3) + b$$

$$b = 4$$

$$y = -2x + 4$$

11. What is the equation of the line which passes through the points (-2, -5) and (1, -2)?

$$m = \frac{-5+2}{-2-1}$$

$$= \frac{-3}{-3} = 1$$

$$y + 5 = 1(x + 2)$$

$$y = x - 3$$

12. The cost \$C of sending a parcel is given by the formula $C = 1.5M + 0.5$ where M is the mass in kilograms. What is the cost of sending a parcel which has a mass of 4 kg.

$$M = 4 \quad C = 1.5(4) + 0.5 = 6.5$$

Cost is \$6.50

13. The mass M (in tonnes) of a steel beam of length L is shown on the graph.

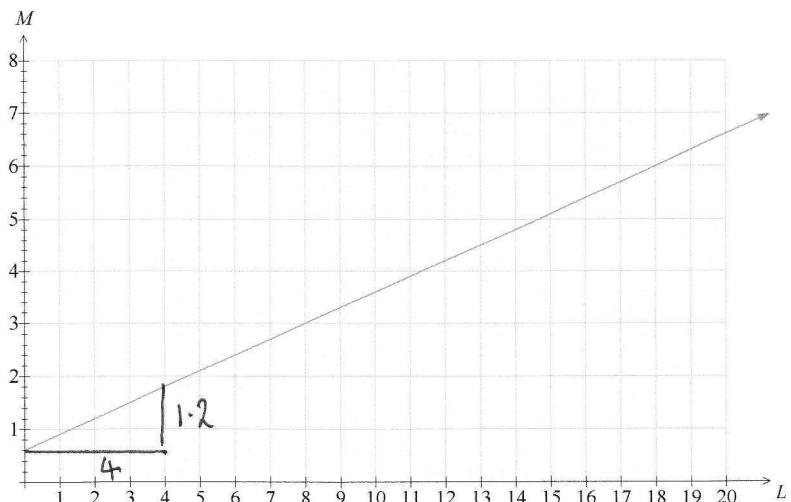
What is the equation of the line?

$$\text{Intercept} = 0.6$$

$$\text{Gradient} = \frac{1.2}{4}$$

$$= 0.3$$

$$M = 0.3L + 0.6$$



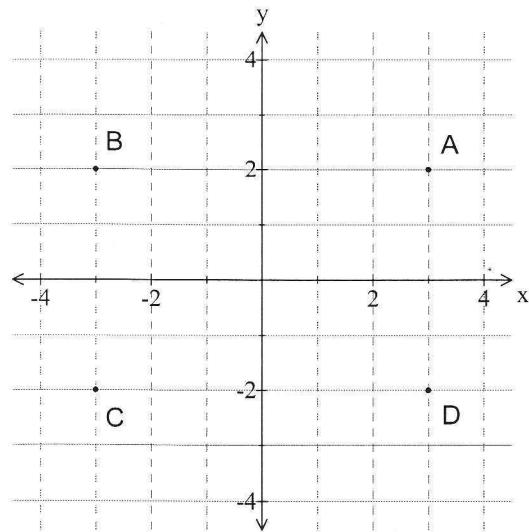
Coordinate Geometry
 Test Calculator
 Year 9
 Multiple Choice Section

Name : _____

Mark all your answers on the accompanying multiple choice answer sheet, not on this test paper. You may do any working out on this test paper. Calculators are allowed for this section.

1. Which point below has coordinates $(-3, -2)$?

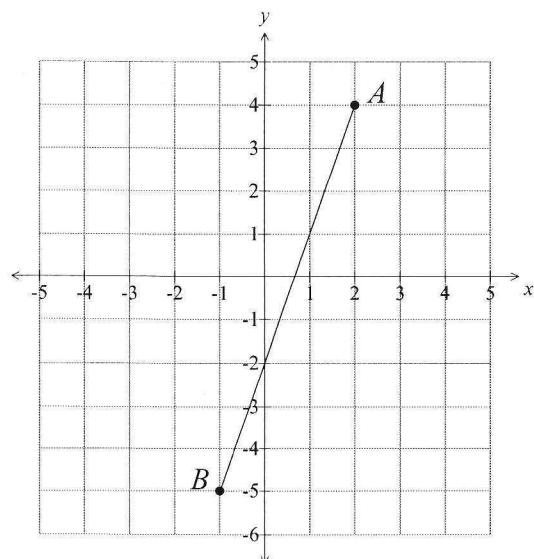
C.



2. The points $A (2, 4)$ and $B (-1, -5)$ lie on a line ℓ .

The equation of the line ℓ , is:

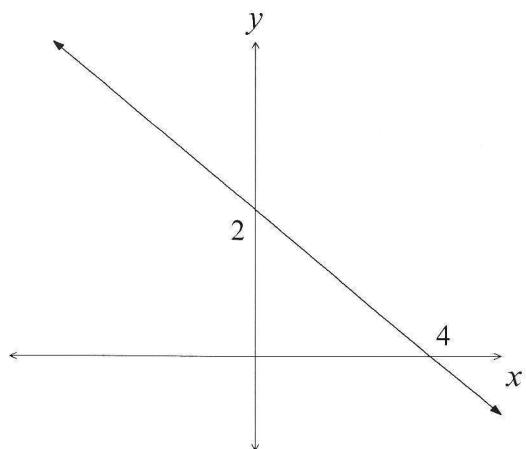
- A. $y = 3x - 2$
- B. $y = x + 2$
- C. $y = 2x - 3$
- D. $y = 4x - 4$



Coordinate Geometry Test

3. The gradient of the line shown is :

- A. $\frac{1}{2}$
- B. $-\frac{1}{2}$
- C. 2
- D. -2



4. Which is the graph of the line $y = -x + 4$?

- A.
 - B.
 - C.
 - D.
- A Cartesian coordinate system showing a line with a negative gradient. The line passes through the y-intercept at (0, 4) and the x-intercept at (4, 0).

A Cartesian coordinate system showing a line with a positive gradient. The line passes through the y-intercept at (0, 4) and the point (4, 8).
- A Cartesian coordinate system showing a line with a negative gradient. The line passes through the y-intercept at (0, -4) and the x-intercept at (-4, 0).

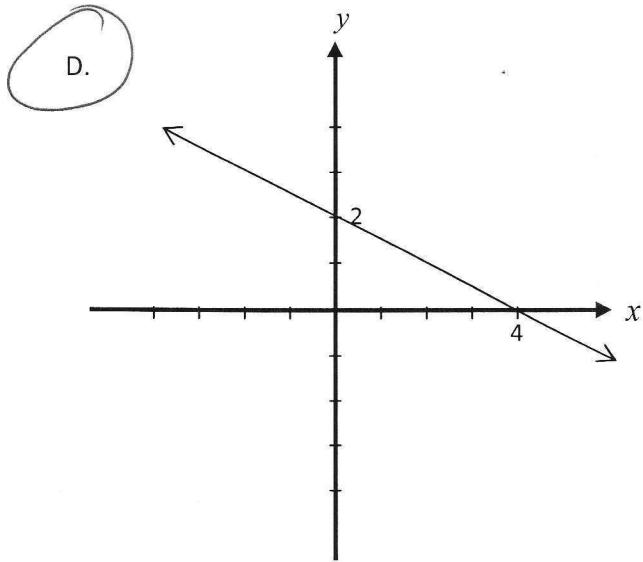
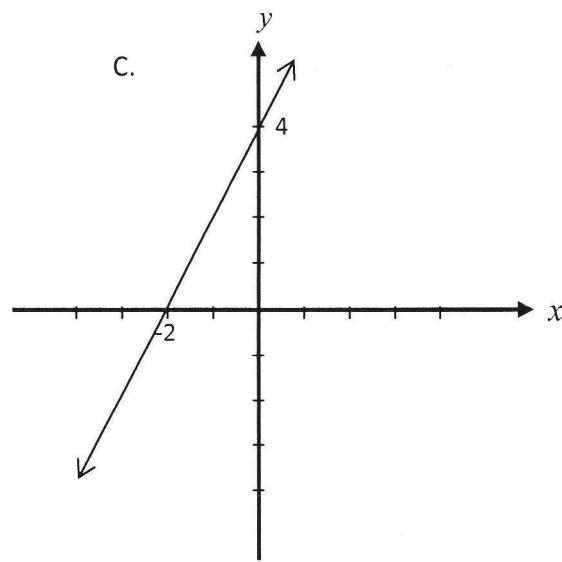
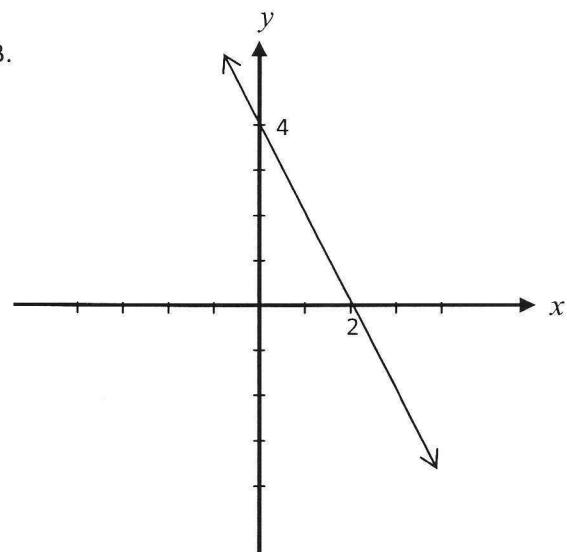
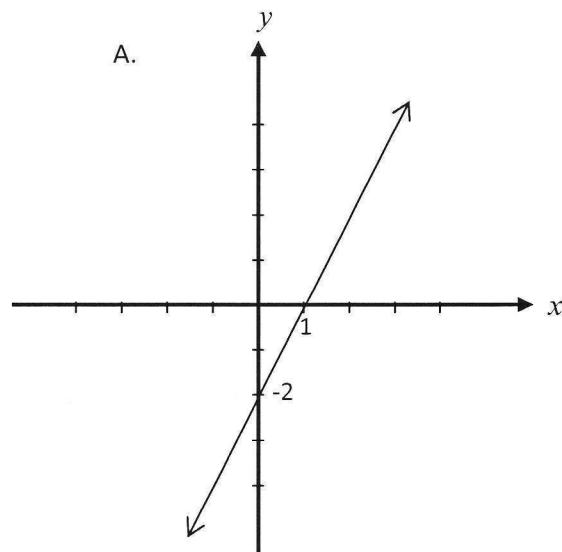
A Cartesian coordinate system showing a line with a positive gradient. The line passes through the y-intercept at (0, 4) and the point (4, 4).

5. Which of the following is the equation of a line which has a gradient of -3?

- A. $y = 3x - 4$
- B. $y = 4x - 3$
- C. $y = 4 - 3x$
- D. $y = 3 - 4x$

Coordinate Geometry Test

6. The equation $y = -\frac{1}{2}x + 2$ is best represented by the graph :



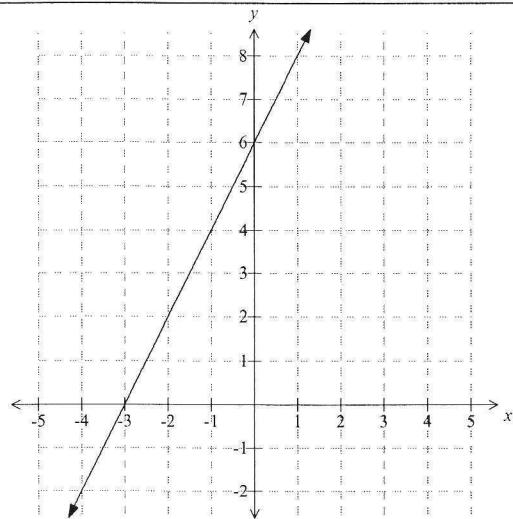
7. What is the gradient of the line shown?

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

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

C. 2

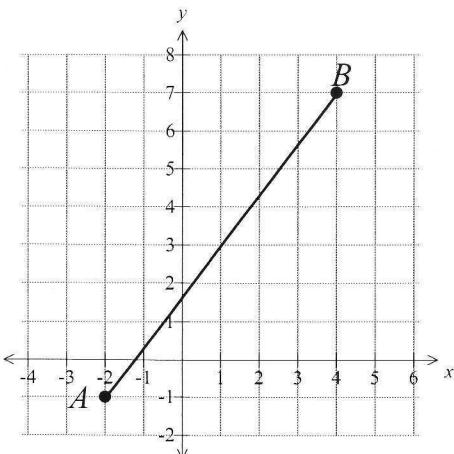
D. -2



Coordinate Geometry Test

8. The points $A (-2, -1)$ and $B (4, 7)$ are plotted on the number plane shown.
What is the distance AB ?

- A. 8 units
- B. 100 units
- C. 14 units
- D. 10 units



9. Which point does not lie on the line $y = 4x - 2$?

- A. $(-2, -10)$
- B. $(0, -2)$
- C. $(2, 6)$
- D. $(4, -2)$

10. Which equation below represents a line which has a y intercept of 4?

- A. $y = 3x - 4$
- B. $y = 4x - 3$
- C. $y = 4 - 3x$
- D. $y = 3 - 4x$

11. What is the midpoint of the interval which has endpoints $(-2, 4)$ and $(-6, -1)$?

- A. $(-2, 1\frac{1}{2})$
- B. $(-4, 1\frac{1}{2})$
- C. $(-2, 2\frac{1}{2})$
- D. $(-4, 2\frac{1}{2})$

12. The line with equation $y = 3x - 2$ has

- A Gradient = $\frac{2}{3}$
- B y intercept = -2
- C Gradient = -3
- D y intercept = 2

Coordinate Geometry
 Test Calculator
 Year 9
 Longer Questions

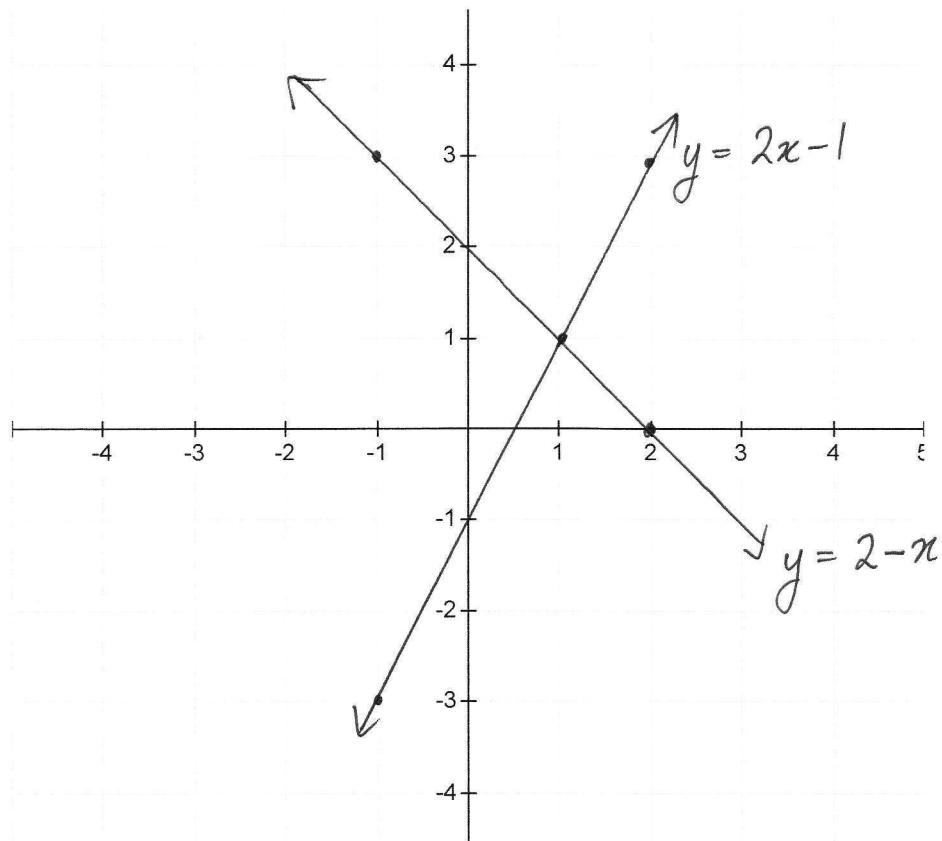
Name : _____

Write all working and answers in the spaces provided on this test paper.
 Calculators are allowed for this section.

1. (a) (2 marks) Complete the table below for the lines whose equations are $y = 2x - 1$ and $y = 2 - x$

x	-1	1	2
$y = 2x - 1$	-3	1	3
$y = 2 - x$	3	1	0

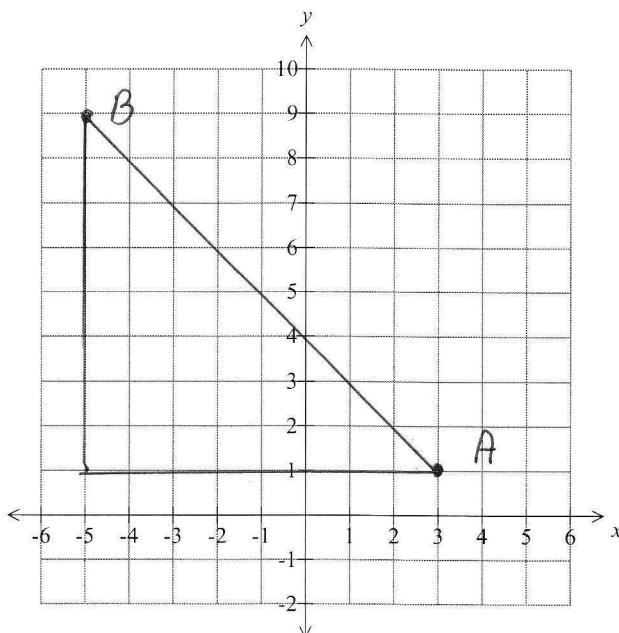
- (b) (2 marks) Draw the graph of the two lines.



- (c) (1 mark) Write the co-ordinates of the point of intersection of the lines. (1, 1)

Coordinate Geometry Test

2. (a) (1 mark) Plot the points $A(3,1)$ and $B(-5,9)$ on the number plane below and join them



- (b) (1 mark) Find the midpoint of AB .

$$\text{Midpoint} \left(\frac{-5+3}{2}, \frac{9+1}{2} \right) = (-1, 5)$$

- (c) (1 mark) Find the gradient of AB .

$$m = \frac{-8}{8} = -1$$

- (d) (1 mark) Find the length of AB .

$$\begin{aligned} AB^2 &= 8^2 + 8^2 \\ &= \sqrt{128} \end{aligned}$$

- (e) (1 mark) Find the equation of the line AB .

$$\text{Grad} = -1 \quad \text{int} = 4$$

$$y = -x + 4$$

Simultaneous Equations Test

Non Calculator

Year

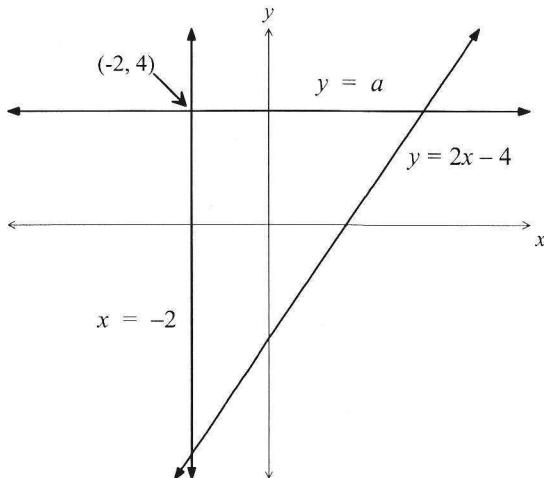
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Short Answer Section

Name : _____

Write all working and answers in the spaces provided on this test paper.

Questions 1 – 3 refer to the number plane below.



1. What is the point of intersection of the lines $y = 2x - 4$ and $x = -2$?

$(-2, -8)$

2. The equation of the horizontal line is given as $y = a$. What is the value of a ?

$a = 4$

3. What is the point of intersection of the lines $y = 2x - 4$ and $y = a$?

$4 = 2x - 4$

$2x = 8$ $x = 4$

4. Solve simultaneously $y = -2x + 3$ and $x = -4$.

$$\begin{aligned}y &= -2(-4) + 3 \\&= 8 + 3 \\&= 11\end{aligned}$$

Point $(-4, 11)$

Simultaneous Equations Test

5. Solve simultaneously $y = 3x - 5$ and $y = 4$.

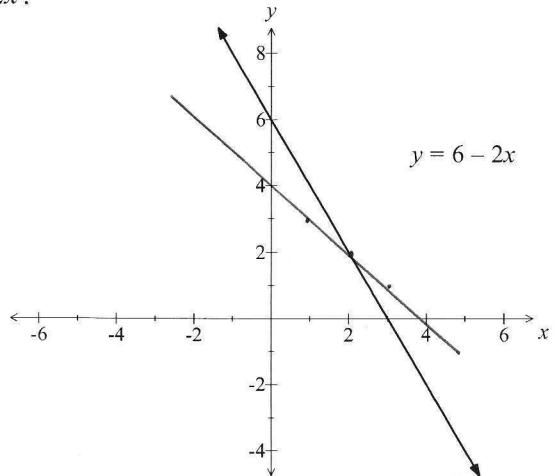
$$4 = 3x - 5$$

$$9 = 3x$$

$$x = 3$$

$(3, 4)$ is pt.

Questions 6 and 7 refer to the graph of $y = 6 - 2x$.



6. A table of values for $y = 4 - x$ has been started below. Complete the table.

x	-1	0	1	2	3
y	5	4	3	2	1

7. Find the point of intersection of $y = 6 - 2x$ and $y = 4 - x$.

$(2, 2)$

Simultaneous Equations Test Calculator

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Multiple Choice Section

Name : _____

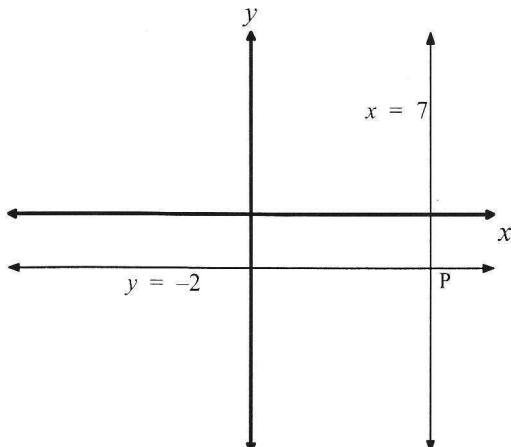
Mark all your answers on the accompanying multiple choice answer sheet, not on this test paper. You may do any working out on this test paper. Calculators are allowed for this section.

1. Solve simultaneously $2x - 3y + 3 = 0$ and $x = 2$.

- A. $(2, 3)$ B. $(2, -3)$ C. $\left(2, 2\frac{1}{3}\right)$ D. $\left(2, -2\frac{1}{3}\right)$
-

2. What are the coordinates of the point P?

- A. $(-2, 7)$
 B. $(7, -2)$
 C. $(-7, 2)$
 D. $(2, -7)$



3. Mareike is trying to solve the equations $y = 3x - 2$ and $y = 2 - 3x$, but has made a mistake in her working. Which line does the mistake occur?

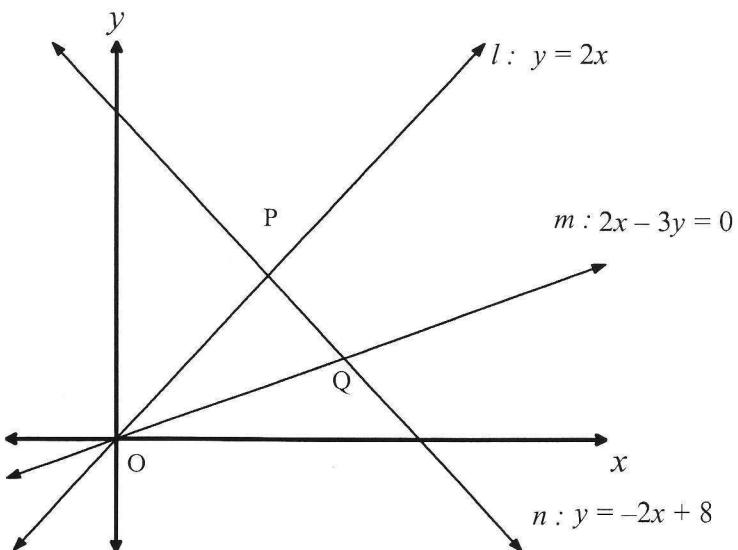
- A. Line 1
 B. Line 2
 C. Line 3
 D. Line 4

$$\begin{aligned}y &= 3x - 4 \\y &= 2 - 3x \\3x - 4 &= 2 - 3x \quad \dots\dots\dots \text{Line 1} \\6x - 4 &= 2 \quad \dots\dots\dots \text{Line 2} \\6x &= 6 \quad \dots\dots\dots \text{Line 3} \\x &= 1 \quad \dots\dots\dots \text{Line 4}\end{aligned}$$

Simultaneous Equations Test

Questions 4 and 5 refer to the number plane.

The number plane shows the lines $l: y = 2x$, $m: 2x - 3y = 0$ and $n: y = -2x + 8$ and their points of intersection O, P and Q.



4. What are the coordinates of the point P?

- A. (0, 0)
 - B. (4, -2)
 - C. (4, 2)
 - D. (2, 4)
-

5. What are the coordinates of the point Q?

- A. (0, 0)
 - B. (3, 2)
 - C. (-1, 6)
 - D. (-3, -14)
-

Simultaneous Equations
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Longer Questions

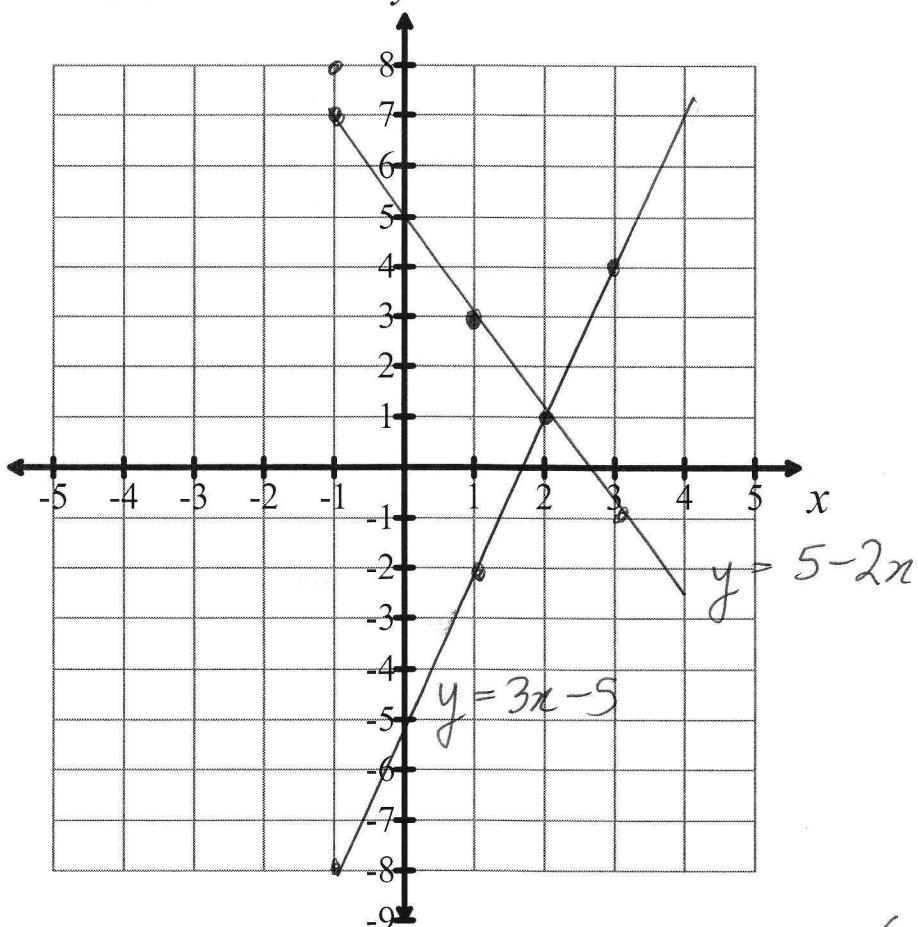
Name : _____

Write all working and answers in the spaces provided on this test paper.
 Calculators are allowed for this section.

1. (a) (2 marks) Complete the table below for the lines whose equations are $y = 3x - 5$ and $y = 5 - 2x$

x	-1	1	2	3
$y = 3x - 5$	-8	-2	1	4
$y = 5 - 2x$	7	3	1	-1

- (b) (2 marks) Draw the graph of the two lines.



- (c) (1 mark) Write the co-ordinates of the point of intersection of the lines.

(2, 1)

Simultaneous Equations Test

2.

- (a) (2 marks) Solve simultaneously $y = 3x + 2$ and $y = 4x + 3$.

$$\begin{aligned} 3x + 2 &= 4x + 3 & y &= 4(-1) + 3 \\ x &= -1 & y &= -1 \\ (-1, -1) \end{aligned}$$

- (b) (2 marks) Solve simultaneously $2x - y - 1 = 0$ and $2x - 3y + 9 = 0$.

$$\begin{aligned} 2x - y - 1 &= 0 & 2y &= 10 & x &= 3 \\ 2x - 3y + 9 &= 0 & y &= 5 & & \\ 2y - 10 &= 0 & 2x - 5 - 1 &= 0 & (3, 5) \end{aligned}$$

- (c) (2 marks) Solve simultaneously $3m - 2n = 1$ and $5m + n = 19$

$$\begin{aligned} 3m - 2n &= 1 & m &= \frac{39}{17} \\ 10m + 2n &= 38 & &= 3 \\ 13m &= 39 & 3(3) - 2n &= 1 \\ n &= 4 & n &= 4 & (3, 4) \end{aligned}$$

- (d) (3 marks) Kim and Kath buy some plants at a nursery. Kath buys 5 roses and 4 camellias for \$132 and Kim buys 3 roses and 2 camellias for \$76.

- (i) Write an equation for each of Kath and Kims purchases using r for the cost of a rose and c for the cost of a camellia.

$$\begin{aligned} 5r + 4c &= 132 \quad (1) & \cancel{\$132} \\ 3r + 2c &= 76 \quad (2) & \cancel{\$76} \\ 6r + 4c &= 152 \quad (3) \quad (2 \times 2) & \cancel{\$152} \end{aligned}$$

- (ii) Solve the equations simultaneously to find the cost of a rose and the cost of a camellia.

$$\begin{aligned} r &= 20 \quad (3) - (1) \\ 100 + 4c &= 132 \\ 4c &= 32 \\ c &= 8 \end{aligned}$$

Rose cost \$20 and camellias cost \$8.

**Non-Linear Equations
Test**

Non Calculator

Year
10

Short Answer Section

Name : _____

Write all working and answers in the spaces provided on this test paper.

1. Solve $(c - 3)(c + 7) = 0$

$$c = 3 \text{ or } c = -7$$

2. Solve $(2m - 3)(m + 8) = 0$

$$2m = 3$$

$$m = 1\frac{1}{2} \quad m = -8$$

3. Solve $z^2 + 4z - 21 = 0$

$$(z+7)(z-3) = 0$$

$$z = -7 \text{ or } z = 3$$

4. Solve $y^2 - 11y + 30 = 0$

$$(y-5)(y-6) = 0$$

$$y = 5 \text{ or } y = 6$$

5. Solve $9a^2 - 16 = 0$

$$(3a - 4)(3a + 4) = 0$$

$$a = \pm \frac{4}{3} = \pm 1\frac{1}{3}$$

6. Solve $5m^2 + 4m - 12 = 0$

$$(5m - 6)(m + 2) = 0$$

$$m = \frac{6}{5}, \quad m = -2$$

7. Give the exact solutions to $3m^2 - m - 1 = 0$.

$$m = \frac{1 \pm \sqrt{1 - 4(3)(-1)}}{2(3)} = \frac{1 \pm \sqrt{13}}{6}$$

8. Give the solutions to $2m^2 - 8m - 3 = 0$, correct to one decimal place.

$$m = \frac{8 \pm \sqrt{64 - 4(2)(-3)}}{2(2)} = \frac{8 \pm \sqrt{88}}{4}$$

$$m = 4.3 \text{ or } -0.3$$

Non- Linear Equations Test

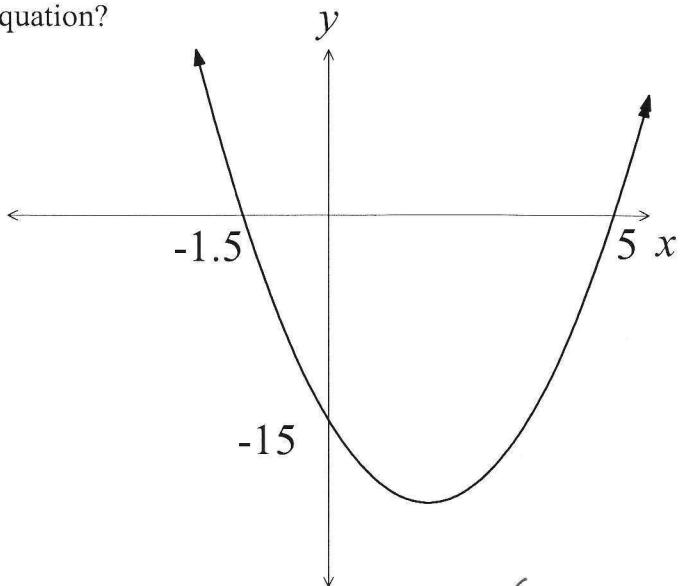
9. Use the table below for the equation $y = 1.2^x$ to estimate the solution to $1.2^x = 3$.

x	4	5	6	7	8	9
y	2.07	2.49	2.99	3.58	4.30	5.16

$$1.2^x = 3$$

$$1.2^6 = 2.99 \quad \text{So } x \approx 6.1$$

10. Jasmine correctly uses the graph below to find the solution to a quadratic equation.
What was the equation?



$$(x + 1.5)(x - 5) = 0$$

$$(2x + 3)(x - 5) = 0.$$

$$2x^2 - 10x + 3x - 15 = 0$$

$$2x^2 - 7x - 15 = 0$$

Non-Linear Equations

Test Calculator

Year

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Multiple Choice Section

Name : _____

Mark all your answers on the accompanying multiple choice answer sheet, not on this test paper. You may do any working out on this test paper. Calculators are allowed for this section.

1. The constant term in the expression $x^2 + 5x + 4$ is:

A. x B. 1 C. 5 D. 4

2. The coefficient of x^2 in the expression $3x - 5x^2 + 4$ is:

A. 4 B. 3 C. -5 D. 5

3. The solutions to $(x + 3)(x - 5) = 0$ are:

A. $x = 3$ and $x = 5$ B. $x = 3$ and $x = -5$
 C. $x = -3$ and $x = -5$ D. $x = -3$ and $x = 5$

4. The solutions to $x(x - 2) = 0$ are:

A. $x = 1$ and $x = 2$ B. $x = 0$ and $x = 2$
 C. $x = 1$ and $x = -2$ D. $x = 0$ and $x = -2$

5. The solutions to $(2x - 1)(3x - 2) = 0$ are:

A. $x = 2$ and $x = 1\frac{1}{2}$ B. $x = -\frac{1}{2}$ and $x = -\frac{2}{3}$
 C. $x = \frac{1}{2}$ and $x = \frac{2}{3}$ D. $x = -2$ and $x = -1\frac{1}{2}$

6. The solutions to $2x^2 + 4x = 0$ are:

A. $x = 1$ and $x = 2$ B. $x = 0$ and $x = 2$
 C. $x = 1$ and $x = -2$ D. $x = 0$ and $x = -2$

7. The solutions to $x^2 + 12x + 35 = 0$ are:

A. $x = 7$ and $x = 5$ B. $x = 12$ and $x = 35$
 C. $x = -5$ and $x = -7$ D. $x = -7$ and $x = 5$

Non- Linear Equations Test

8. The solutions to $x^2 + 5x - 36 = 0$ are:

- A. $x = -36$ and $x = 5$ B. $x = 9$ and $x = -4$
 C. $x = -9$ and $x = -4$ D. $x = -9$ and $x = 4$
-

9. The solutions to $m^2 + 40 = 13m$ are:

- A. $m = 8$ and $m = 5$ B. $m = -8$ and $m = 5$
 C. $m = -8$ and $m = -5$ D. $m = 8$ and $m = -5$
-

10. $x^2 + 3x - 5 = 0$ has solutions:

- A. $x = \frac{-3 \pm \sqrt{29}}{2}$ B. $x = \frac{3 \pm \sqrt{29}}{2}$
 C. $x = \frac{-3 \pm \sqrt{11}}{2}$ D. $x = \frac{3 \pm \sqrt{11}}{2}$
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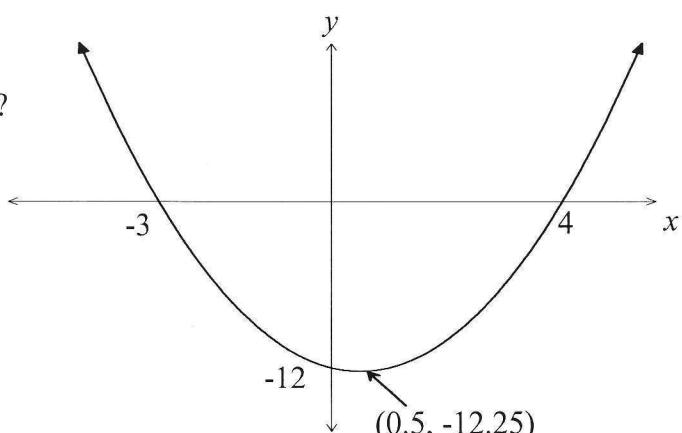
11. $2x^2 - 6x - 3 = 0$ has solutions:

- A. $x = \frac{-6 \pm \sqrt{60}}{4}$ B. $x = \frac{6 \pm \sqrt{60}}{4}$
 C. $x = \frac{-6 \pm \sqrt{12}}{4}$ D. $x = \frac{6 \pm \sqrt{12}}{4}$
-

12. The sketch of $y = ax^2 + bx + c$ is shown.

What are the solutions to $ax^2 + bx + c = 0$?

- A. $x = 3$ and $x = 4$
 B. $x = -3$ and $x = 4$
 C. $x = 3$ and $x = -4$
 D. $x = -12.25$ and $x = 0.5$

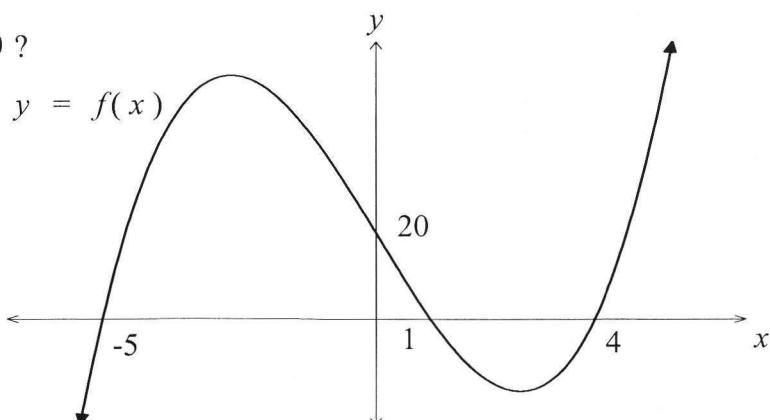


Non- Linear Equations Test

13. The sketch of $y = f(x)$ is shown.

Which is not a solution to $f(x) = 0$?

- A. $x = -5$
- B. $x = 1$
- C. $x = 4$
- D. $y = 20$



14. Candice used the table below for the equation $y = 3^x$ to estimate the solution to $3^x = 20$.

x	2.5	2.6	2.7	2.8	2.9	3.0
$y = 3^x$	15.6	17.4	19.4	21.7	24.2	27

Which is the best solution (correct to one decimal place) to $3^x = 20$.

- A. $x = 2.6$
- B. $x = 2.7$
- C. $x = 2.8$
- D. $x = 2.9$

Linear Equations Test Non Calculator

Year

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Short Answer Section

Name : _____

Write all working and answers in the spaces provided on this test paper.

1. Solve $3x - 4 = 11$.

$$3x = 15$$

$$x = 5$$

2. Solve $5a - 3 = 11 - 2a$.

$$7a = 14$$

$$a = 2$$

3. Solve $5(2c - 7) = 5$.

$$10c - 35 = 5$$

$$10c = 40$$

$$c = 4$$

4. Solve $\frac{5b - 1}{3} = 13$.

$$5b - 1 = 39$$

$$5b = 40$$

$$b = 8$$

5. Solve the equation $12x - 8 = 2(3x + 5)$.

$$12x - 8 = 6x + 10$$

$$6x = 18$$

$$x = 3$$

6. Determine if $m = -3$ is a solution to the equation $5m + 8 = m - 4$.

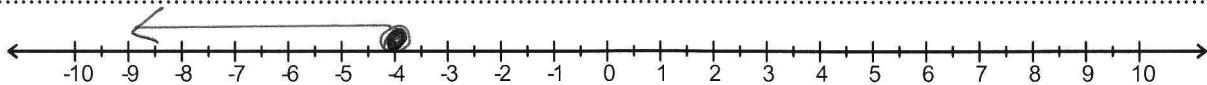
$$\text{LHS} = -15 + 8 = -7 \quad \text{RHS} = -3 - 4 = -7$$

YES IT IS A SOLUTION

7. Sketch the solution to $2y - 4 \leq -12$.

$$2y \leq -8$$

$$y \leq -4$$



8. Using the formula $s = \frac{n(a + l)}{2}$, find the value of l when $s = 48$, $n = 8$ and $a = 5$.

$$48 = \frac{8}{2}(5 + l)$$

$$48 = 20 + 4l$$

$$48 = 4(5 + l)$$

$$28 = 4l$$

$$l = 7$$

Linear Equations Test

Linear Equations Test

Calculator

Year

9 Multiple Choice Section

Name :

Mark all your answers on the accompanying multiple choice answer sheet, not on this test paper. You may do any working out on this test paper. Calculators are allowed for this section.

1. Solve for e :

$$\frac{e-2}{4} = 2$$

- A. $e = 0$ B. $e = 8\frac{1}{2}$ C. $e = 6$ D. $e = 10$

2. If $s = ut + \frac{at^2}{2}$, and $u = 20$, $a = 10$ and $t = 3$, what is the value of s ?

- A. $s = 105$ B. $s = 510$ C. $s = 74.5$ D. $s = 283.5$

3. Which is the correct solution to the equation:

$$3(2x + 5) = 3$$

- A. $x = -3$ B. $x = -2$ C. $x = 2$ D. $x = 3$

4. The inequation $x + 5 \leq 3x + 9$ has solution

- A. $x \geq -2$ B. $x \leq -2$ C. $x \geq 2$ D. $x \leq 2$

5. If $v = u + at$ find a when $v = 12$, $u = 3$ and $t = 1.5$

- A. $a = -6$ B. $a = 6$ C. $a = 10$ D. $a = 15$

6. Which line in the solution of an equation below, contains an error.

$$\frac{4x - 1}{3} = x + 6$$

$$4x - 1 = 3(x + 6) \dots\dots\text{Line 1}$$

$$x - 1 = 6 \dots \text{Line 3}$$

$$x = 7 \dots \text{Line 4}$$

- A. Line 1 B. Line 2 C. Line 3 D. Line 4

Linear Equations Test

7. Which of the following is the solution to the equation

$$3(x + 4) = x + 22$$

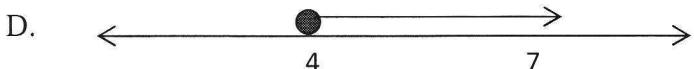
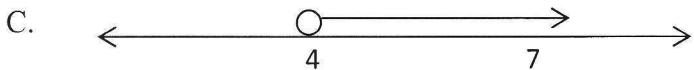
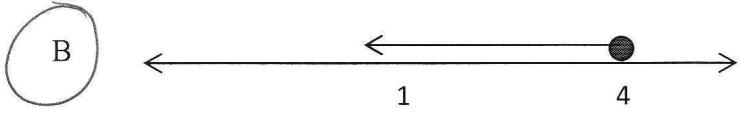
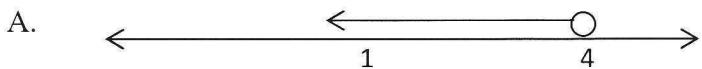
- A. $x = 5$ B. $x = 9$ C. $x = 2$ D. $x = -5$

-
8. Find the solution to the equation

$$\frac{2x + 5}{6} = \frac{x - 3}{2}$$

- A. $x = 4$ B. $x = 14$ C. $x = 7$ D. $x = 5$

-
9. Which number line graph represents $x \leq 4$?



-
10. The solution to $2x - 5 \geq 6x + 5$ is:

- A. $x \geq 2\frac{1}{2}$ B. $x \geq -2\frac{1}{2}$ C. $x \leq 2\frac{1}{2}$ D. $x \leq -2\frac{1}{2}$

Year
10

Functions and Graphs Non Calculator
Test
Short Answer Section

Name : _____

Write all working and answers in the spaces provided on this test paper.

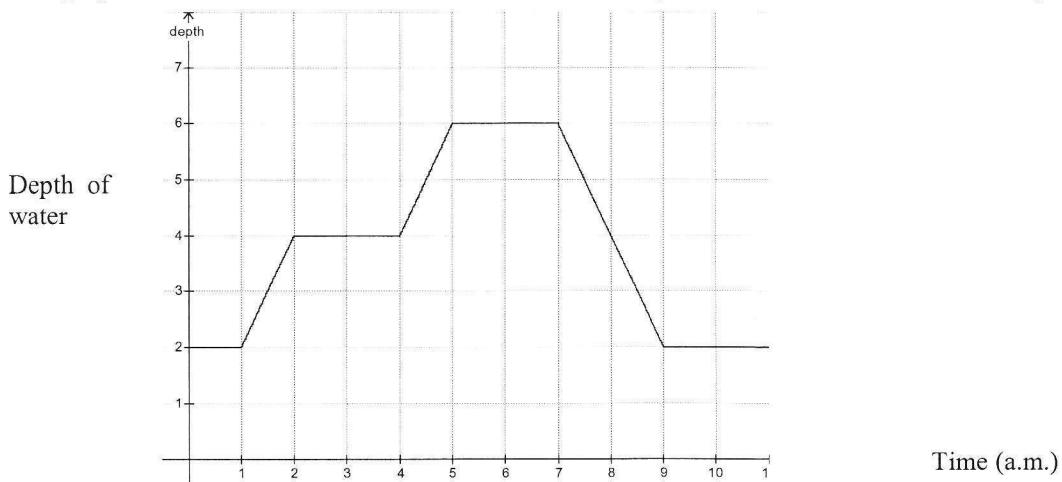
1. Find the missing values in the table below for the equation

$$y = 2x^2 + 2$$

x	-2	-1	0	1
y	10	4	2	4

Questions 2 and 3 refer to the graph below

The graph shows the water level in a river on a morning when a flash flood came through.



2. By how much did the water level rise, from the original depth to its peak ?

Rose by 4 m (from 2m to 6m)

3. At what time did the river return to its original depth ?

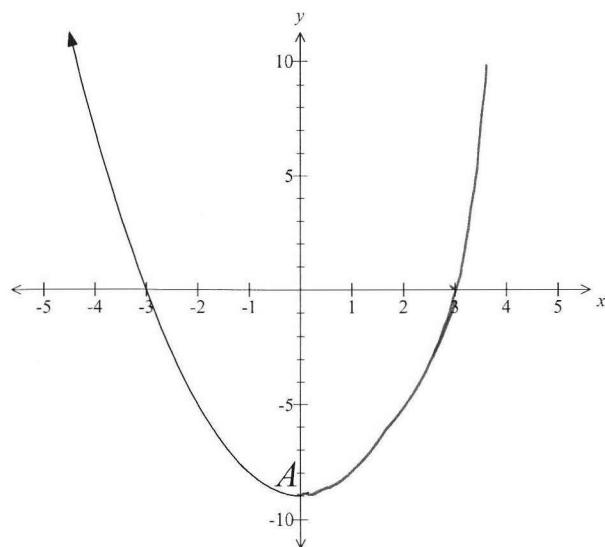
9 a.m.

Functions and Graphs Test

4. Part of a parabola has been drawn.

The point A (0, -9) is the vertex of the parabola.

Draw a neat sketch of the rest of the parabola.



5. A circle has equation $x^2 + y^2 = 4$. What is the radius of the circle?

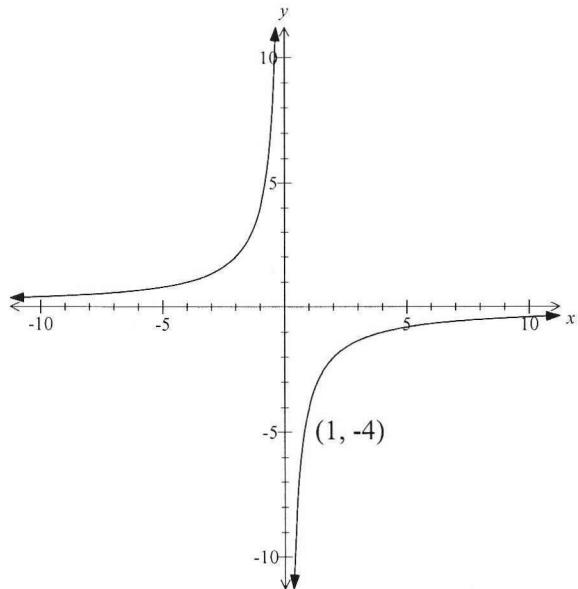
$$x^2 + y^2 = r^2 = 4 = 2^2$$

$$\text{radius} = 2$$

6. A graph is shown.

Write a possible equation of the graph.

$$y = -\frac{4}{x}$$



Functions Test

Calculator

Year

10

Multiple Choice Section

Name : _____

Mark all your answers on the accompanying multiple choice answer sheet, not on this test paper. You may do any working out on this test paper. Calculators are allowed for this section.

1. Which equation below would represent a hyperbola?

A. $y = \frac{4}{x}$

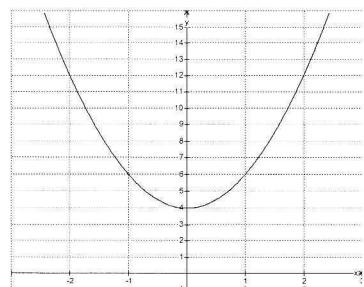
B. $y = 4x - 3$

C. $3x + y = 4$

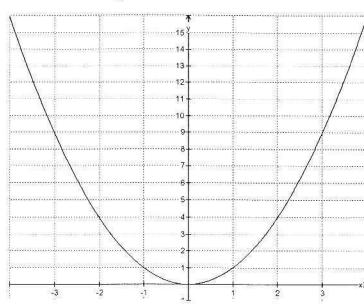
D. $y = 3x^2 + 4$

2. Which graph below could have an equation of $y = 2x^2 + 4$?

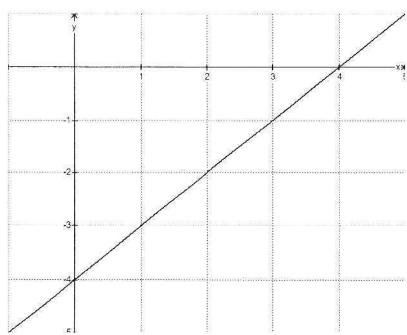
A.



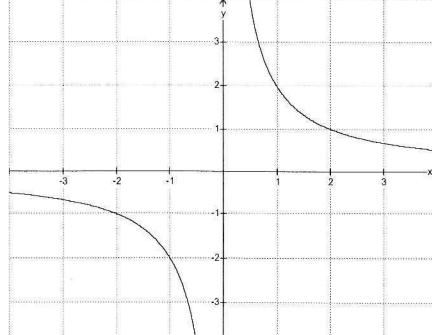
B.



C.



D.



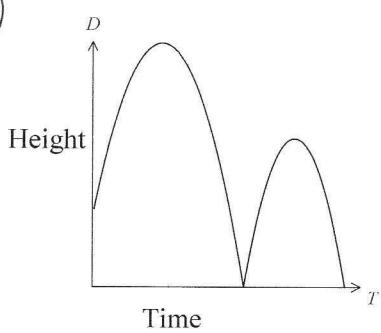
3. Which graph does not include the point $(2, 4)$?

A. $y = 2x$ B. $xy = 6$ C. $x + y = 6$ D. $y = x^2$

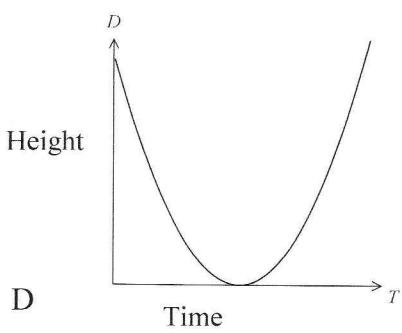
Functions and Graphs Test

4. Which graph below best represents the height of a ball thrown up in the air which falls back to ground and bounces?

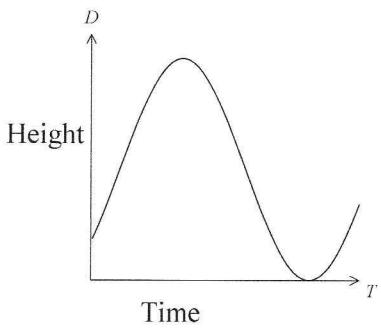
A



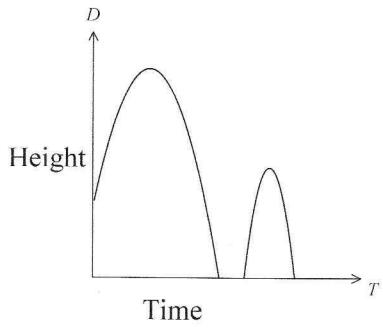
B



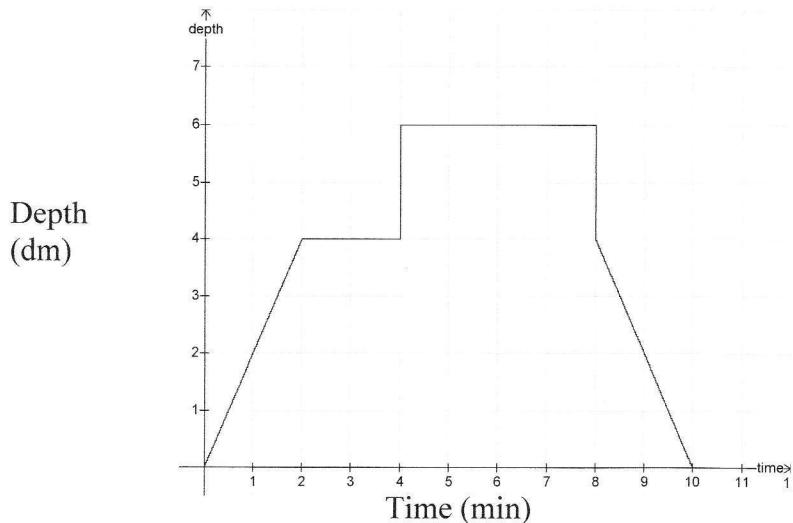
C



D



5. The graph below represents the depth of water in Joels bath. He first filled the bath with water, then shortly after got into the bath. After getting out, he let the water out.



How long did Joel remain in the bath ?

- A. 2 min B. 10 min C. 4 min D. 6 min

Functions and Graphs Test

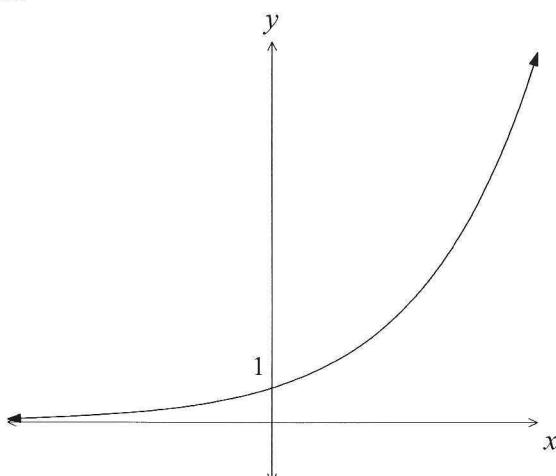
6. Which equation could describe the graph shown?

A. $y = x^2 + 1$

B. $y = 2x + 1$

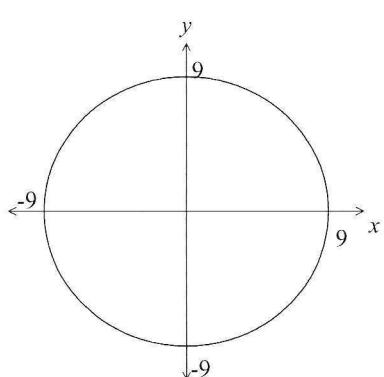
C. $y = 2^x$

D. $y = 2^x + 1$

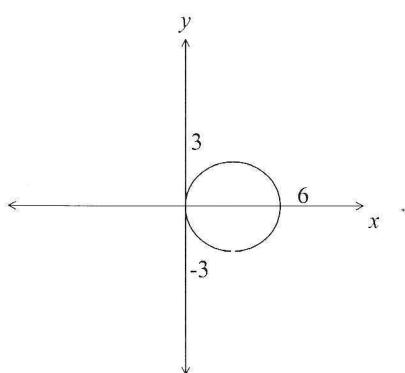


7. Which graph would represent the circle with equation $x^2 + y^2 = 9$.

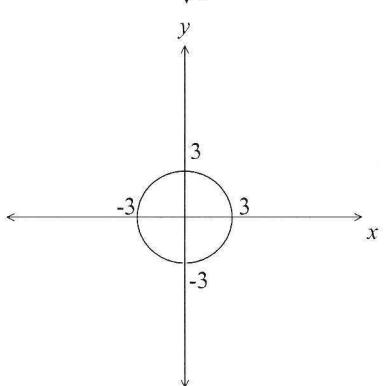
A.



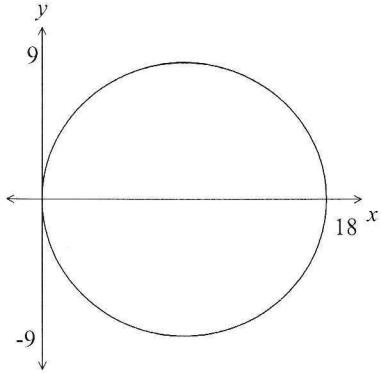
B.



C.



D.



8. The graph of $y = x^2 - 4$ would have a y intercept at:

A. $y = 0$

B. $y = 2$

C. $y = 4$

D. $y = -4$

Functions and Graphs Test

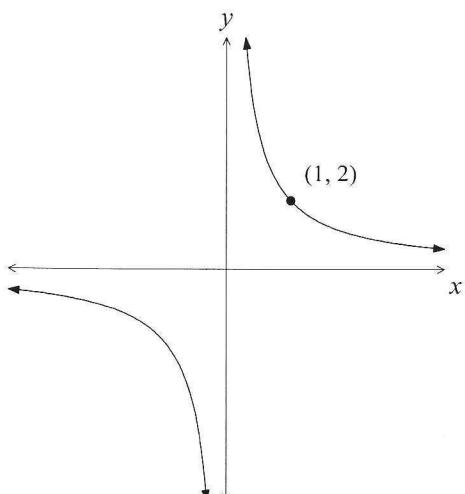
9. Which equation could describe the graph shown?

A. $y = x^2$

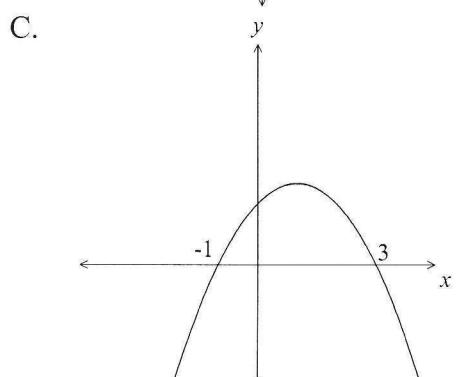
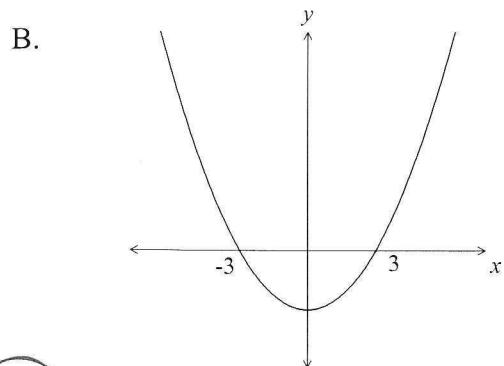
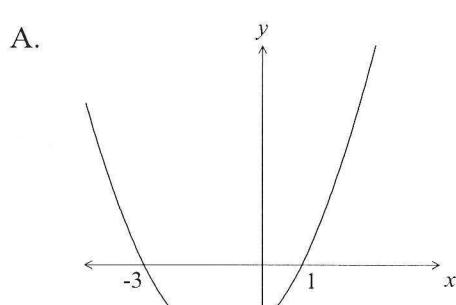
B. $y = \frac{2}{x}$

C. $y = 2^x$

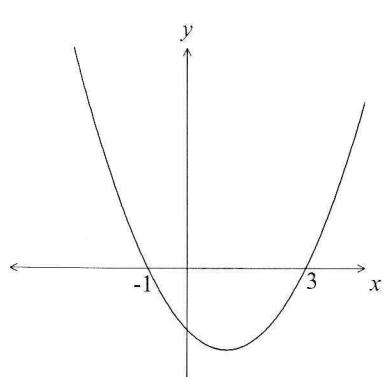
D. $y = 2x$



10. Which graph would represent the parabola with equation $y = (x - 3)(x + 1)$.



D.



Functions and Graphs **Non Calculator**
Year
Test

10

Longer Answer Section

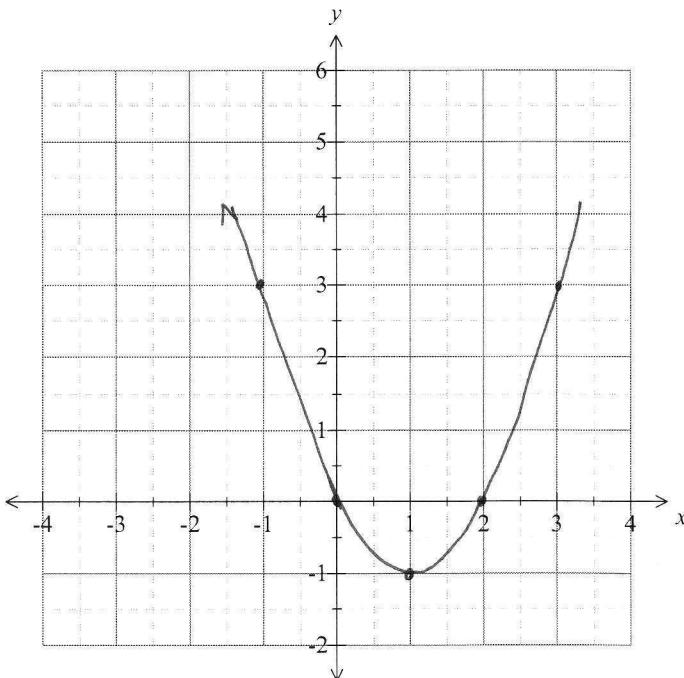
Name : _____

Write all working and answers in the spaces provided on this test paper.

1. (a) (2 marks) Complete the table below for the equation $y = x^2 - 2x$.

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

- (b) (3 marks) Use the axes below to draw a sketch of $y = x^2 - 2x$.



- (c) (1 mark) Use the graph to estimate the value of $x^2 - 2x$ when $x = 2.5$.

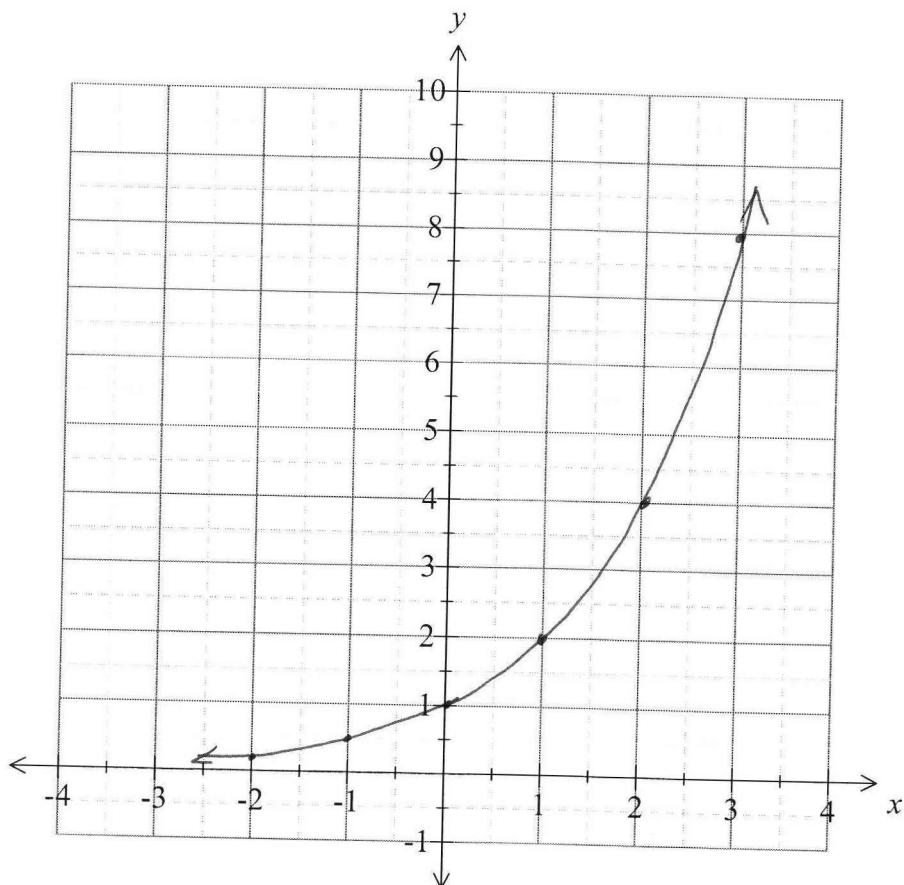
y ≈ 1.5

Functions and Graphs Test

2. (a) (2 marks) Complete the table of values for $y = 2^x$.

x	-2	-1	0	1	2	3
y	$\frac{1}{4}$	$\frac{1}{2}$	1	2	4	8

- (b) (3 marks) Use the axes below to draw a sketch of $y = 2^x$.



- (c) (1 mark) Use the graph to estimate the value of $2^{1.5}$.

$y \doteq 2.75$

Factorisation Test

Non Calculator

Year

10

Short Answer Section

Name : _____

Write all working and answers in the spaces provided on this test paper.

1. Factorise
- $32x + 40$
- .

$$= 8(4x - 5)$$

2. Factorise
- $6mp^2 - 30mp^3$
- .

$$= 6mp^2(1 - 5p)$$

3. Factorise
- $c^4d - c^5e$
- .

$$= c^4(d - ce)$$

4. Factorise
- $a(m + n) + b(m + n)$
- .

$$= (m + n)(a + b)$$

5. Factorise
- $a^2 + 14a + 45$
- .

$$= (a + 5)(a + 9)$$

6. Factorise
- $e^2 - 2e - 15$
- .

$$= (e - 5)(e + 3)$$

7. Factorise
- $g^2 - 13g + 40$
- .

$$= (g - 5)(g - 8)$$

8. Factorise
- $b^2 + b - 56$
- .

$$= (b + 8)(b - 7)$$

9. Factorise
- $a^2 - 4a - 77$
- .

$$= (a + 7)(a - 11)$$

Factorisation Test

10. Factorise $y^2 - 18y + 81$.

$$= (y-9)^2$$

11. Factorise $m^2 - 25$.

$$= (m+5)(m-5)$$

12. Factorise completely $2a^2 + 26a - 60$.

$$= 2a^2 + 30a - 4a - 60$$

$$= 2a(a+15) - 4(a+15) = 2(a-2)(a+15)$$

13. Factorise $3w^2 + 13w - 30$.

$$= 3w^2 + 18w - 5w - 30$$

$$= 3w(w+6) - 5(w+6) = (3w-5)(w+6)$$

14. Factorise completely $2s^2 + 19s + 35$.

$$2s^2 + 14s + 5s + 35 = 2s(s+7) + 5(s+7)$$

$$= (2s+5)(s+7)$$

15. Factorise completely $6b^2c - 54cd^2$.

$$= 6c(b^2 - 9d^2)$$

$$= 6c(b-3d)(b+3d)$$

Factorisation Test
Calculator
Year 10 **Multiple Choice Section**

Name : _____

Mark all your answers on the accompanying multiple choice answer sheet, not on this test paper. You may do any working out on this test paper. Calculators are allowed for this section.

1. Factorise completely $4pq^2 - 32p^2q$.

A. $4pq(q + 8p)$ B. $4pq(q - 8p)$ C. $4q(q - 8p)$ D. $4p(q - 8p)$

2. Which of the following is not equal to $8a^2b - 12ab^2$

A. $4(2a^2b - 3b^2)$ B. $2a(4ab - 6b^2)$
 C. $ab(8a - 12b)$ D. $4b(2a^2 - 3ab)$

3. Factorise $a(m + n) + c(m + n)$.

A. $(m + n)(a + c)$ B. $am + an + mc + nc$
 C. $(a + m)(n + c)$ D. $(a + n)(m + c)$

4. Factorise $a^2 + 14a + 48$.

A. $(a + 12)(a + 4)$ B. $(a + 7)(a + 2)$
 C. $(a + 6)(a + 8)$ D. $(a + 5)(a + 9)$

5. Factorise $b^2 - 4b - 60$.

A. $(b + 10)(b - 6)$ B. $(b - 12)(b + 5)$
 C. $(b - 15)(b + 4)$ D. $(b - 10)(b + 6)$

6. Factorise $e^2 + 4e - 45$.

A. $(e + 9)(e - 5)$ B. $(e - 9)(e + 5)$
 C. $(e - 15)(e + 3)$ D. $(e + 15)(e - 3)$

7. Factorise $g^2 - 12g + 20$.

A. $(g - 5)(g - 4)$ B. $(g - 10)(g + 2)$
 C. $(g + 10)(g - 2)$ D. $(g - 10)(g - 2)$

8. Factorise $y^2 - 16y + 64$.

A. $(y + 8)^2$ B. $(y - 8)^2$ C. $(y - 8)(y + 8)$ D. $8y(y - 8)$

Factorisation Test

9. Factorise completely $2c^2 + 26c + 60$.

- A. $(c + 20)(c + 3)$ B. $(2c + 10)(c + 3)$
 C. $(c + 20)(2c + 3)$ D. $2(c + 10)(c + 3)$
-

10. Factorise $3w^2 - 17w + 20$.

- A. $(3w - 4)(w - 5)$ B. $(3w - 10)(w - 2)$
 C. $(3w - 2)(w - 10)$ D. $(3w - 5)(w - 4)$
-

11. Factorise $6x^2 + 5x - 4$.

- A. $(2x - 1)(3x + 4)$ B. $(6x - 1)(x + 4)$
 C. $2(x - 1)(3x + 2)$ D. $(2x + 1)(3x - 4)$
-

12. $\frac{g^2 + 8g + 12}{g^2 + 10g + 24}$ can be simplified to:

- A. $\frac{g + 6}{g + 4}$ B. $\frac{g + 2}{g + 4}$ C. $\frac{g + 2}{g + 6}$ D. $\frac{g + 4}{g + 2}$
-

13. $\frac{2}{x^2 + 4x} + \frac{2x}{x^2 + 6x + 8}$

- A. $\frac{2x^2 + 2x + 2}{x^3 + 6x^2 + 8x}$ B. $\frac{2x^2 + 2x + 4}{x^2 + 6x + 8}$ C. $\frac{4x^2 + 2}{x^3 + 6x^2 + 8x}$ D. $\frac{4x^2 + 2x}{x^3 + 6x^2 + 8x}$
-

14. $\frac{x^2 + 5x + 6}{x^2 + 5x} \times \frac{x + 5}{x^2 + 3x}$

- A. $\frac{x + 2}{x^2}$ B. $\frac{6x + 30}{x^2 + 3x}$ C. $\frac{x + 11}{x^2 + 3x}$ D. $\frac{31x + 40}{x^4 + 23}$
-

15. $\frac{x^2 + 2x}{x^2 + 4x + 3} \div \frac{x^2 + 3x + 2}{x + 3}$

- A. $\frac{x^3 + 4x^2 + 4x}{x^2 + 6x + 9}$ B. $\frac{x}{x^2 + 2x + 1}$ C. $\frac{2x + 1}{2x + 10}$ D. $\frac{1}{5x^2 + 10}$
-

Basic Algebra Skills Test Non Calculator

Year

9

Short Answer Section

Name : _____

Write all working and answers in the spaces provided on this test paper.

1. Simplify $3x \times 4yz$

$$= 12xyz$$

2. Simplify $-2a \times 3a$

$$= -6a^2$$

3. Simplify $3m + 7m + 4m - 5m$

$$= 9m$$

4. Simplify $3a + 4b + 7a - 2b$

$$= 10a + 2b$$

5. Simplify completely: $2m \times 3n + 8m - 2mn - 12m$

$$= 6mn + 8m - 2mn - 12m$$

$$= 4mn - 4m$$

6. Simplify completely: $9ab - 6a^2 - 7ab - 12a^2$

$$= 2ab - 18a^2$$

7. If $m = 6$, $n = -3$ and $p = -2$, what is the value of $n^2 - mp$.

$$= (-3)^2 - 6 \times (-2)$$

$$= 9 + 12 = 21$$

Basic Algebra Skills Test

8. If $p = 10$, $q = 8$ and $r = -4$, what is the value of $\frac{pq}{5r^2}$?

$$= \frac{10 \times 8}{5 \times (-4)^2} = \frac{80}{80} = 1$$

-
9. Simplify $3m^2 - 2mn - 4nm - 6m^2$

$$= -3m^2 - 6mn$$

-
10. Simplify $6a^2b \times 3abc$

$$= 18a^3b^2c$$

-
11. Expand $3(a + 2)$

$$= 3a + 6$$

-
12. Expand $6b(2ab + 5a)$

$$= 12ab^2 + 30ab$$

-
13. Expand and simplify: $8c + 5 + 3(c + 2)$

$$= 8c + 5 + 3c + 6$$

$$= 11c + 11$$

-
14. Expand and simplify: $3(m - 4) + 4(m - 2)$

$$= 3m - 12 + 4m - 8$$

$$= 7m - 20$$

15 Simplify $3m^2 \times 2m^3$

$$= 6m^5$$

16 Simplify $\frac{b^3 \times b^5}{b^4}$

$$= \frac{b^8}{b^4} = b^4$$

17 Simplify $\frac{2m^2 n \times 8mn^4}{4mn^3}$

$$= \frac{16m^3 n^5}{4m n^3} = 4m^2 n^2$$

18 Expand $3x^3y(2y - 3x^2)$

$$= 6x^3 y^2 - 9x^5 y$$

19. Factorise $15mn^2 - 9m^2n$

$$= 3mn(5n - 3m)$$

20. Simplify $\frac{12m^2 n^3 \times 2mn^2}{2mn \times 4n^4}$

$$= \frac{24m^3 n^5}{8m n^5}$$

$$= 3m^2$$

Basic Algebra Skills Test

Calculator

Year

9 Multiple Choice Section

Name : _____

Mark all your answers on the accompanying multiple choice answer sheet, not on this test paper. You may do any working out on this test paper. Calculators are allowed for this section.

1. Simplify $2x - 7y - 5x - 3y$

A. $-3x + 10y$ B. $-3x - 4y$ C. $3x - 10y$ D. $-3x - 10y$

2. Simplify $7xy - 2x^2 + 6yx$

A. $xy - 2x^2$ B. $13xy - 2x^2$
 C. $xy + 2x^2$ D. $13xy + 2x^2$

3. Simplify $\frac{3x^2y \times 6x^5y^3}{9x^3y^2}$

A. $9x^4y^2$ B. $2x^4y^2$ C. $2x^4y$ D. $9x^7y^2$

4. Which of the following is not equal to $16a^4b^9$

A. $2ab^4 \times 8a^3b^5$ B. $7a^4b^9 + 9a^4b^9$
 C. $(4a^2b^3)^2$ D. $\frac{32a^7b^{12}}{2a^3b^3}$

5. The formula $d = \frac{at^2}{2}$ gives the distance

travelled by a dragster accelerating from a standing start, where

d = distance travelled in metres.
 a = acceleration in metres/second².
 t = time that it is accelerating in seconds.

What is the acceleration of a dragster that accelerates over 200m in 5 seconds?

A. 4 m/s^2 B. 16 m/s^2 C. 5 m/s^2 D. 64 m/s^2

6. Which expression below is NOT equivalent to $6x$

A. $3 \times 2x$ B. $3x + 2x$ C. $4x + 2x$ D. $x + x + x + x + x + x$

Basic Algebra Skills Test

7. When $a = -4$ and $b = -2$ the value of $\frac{ab}{2}$ is :

A. 4

B. -4

C. 21

D. -3

8. $3(2x - 4) =$

A. $5x - 1$

B. $6x - 4$

C. $6x - 12$

D. $5x - 12$

9. Which expression below represents "Half the sum of x and y ".

A. $2(x + y)$

B. $x + \frac{1}{2}y$

C. $\frac{1}{2}x + y$

D. $\frac{x + y}{2}$

10. $3m \times 2n \times 5m$ can be simplified to:

A. $10mn$

B. $30m^2n$

C. $10m^2n$

D. $8m + 2n$

11. $12a + b - 3a + 12b =$

A. $9a + 13b$

B. $22ab$

C. $15a - 11b$

D. $9a + 12b$

12. $\frac{12x^2y}{4x} =$

A. $3y$

B. $8xy$

C. $3xy$

D. $3x$

13. $\frac{16m^2n}{12mn^2} =$

A. $4mn$

B. $\frac{4mn}{3}$

C. $\frac{4m}{3n}$

D. $\frac{4n}{3m}$

14. The factorisation of $10y - 15$ is :

A. $10(y - 15)$

B. $5(2y - 15)$

C. $10(2y - 3)$

D. $5(2y - 3)$

15. $12a^2 - 8ab$ when fully factorised is:

A. $2(6a^2 - 4ab)$

B. $a(12a - 8b)$

C. $4(3a^2 - 2ab)$

D. $4a(3a - 2b)$

16. When $a = 7$ and $b = -3$ the value of $\frac{a^2 - 5b}{8}$ is

A. 64

B. 3

C. $50\frac{7}{8}$

D. 8

17. The coefficient of y in $y^3 - 3y^2 - 5y + 3$ is

A. 5

B. -3

C. -5

D. 0

Basic Algebra Skills Test

18. The constant term in $11 - 3y - 5y^2 + 2y^3$ is

- A. 0 B. 2 C. -3 D. 11

19. $\frac{3a}{5cd} \times \frac{10bc}{9a} =$

- A. $\frac{30ac}{45d}$ B. $\frac{2bc}{3a}$ C. $\frac{2b}{3d}$ D. $\frac{2ac}{3d}$
-

20. $\frac{x}{4} + \frac{3x}{8} =$

- A. $\frac{4x}{12}$ B. $\frac{5x}{8}$ C. $\frac{x}{3}$ D. $\frac{5x}{12}$
-

Year

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Algebraic Products Test Non Calculator

Short Answer Section

Name : _____

Write all working and answers in the spaces provided on this test paper.

1. Simplify $4x + 2 + 3x + 9 =$

.....
 $7x + 11$

2. Simplify $-2 - 11p + 2p^2 - 13p + 3 =$

.....
 $2p^2 - 24p + 1$

3. Expand $2(x + 3)$

.....
 $2x + 6$

4. Expand $2z(3a - 2z) =$

.....
 $6az - 4z^2$

5. Expand and simplify $5 - 3(2 - 4x) + 3x =$

.....
 $5 - 6 + 12x + 3x = 15x - 1$

6. Expand and simplify $2a(a + 3b) - 3a(2b - 3a) =$

.....
 $2a^2 + 6ab - 6ab + 9a^2 = 11a^2$

7. Expand and simplify $7b(a - 2b) - (3ab - 2b^2) =$

.....
 $7ab - 14b^2 - 3ab + 2b^2 = 4ab - 12b^2$

8. Expand and simplify $(a + 4)(a + 7) =$

.....
 $a^2 + 11a + 28$

9. Expand and simplify $(y + 3)(y - 6) =$

.....
 $y^2 - 3y - 18$

Algebraic Products Test

10. Expand and simplify $(p - 5)(p - 4)$.

$$p^2 - 9p + 20$$

11. Expand and simplify $(2m + 5)(m - 9)$.

$$2m^2 - 18m + 5m - 45$$

$$= 2m^2 - 13m - 45$$

12. Expand and simplify $(3b + 4)(3b - 4)$

$$9b^2 - 16$$

Algebraic Products Test

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Multiple Choice Section

Name : _____

Mark all your answers on the accompanying multiple choice answer sheet, not on this test paper. You may do any working out on this test paper. Calculators are allowed for this section.

1. Simplify $2m + 2n - 4m - n$

A. $-2m + n$ B. $-2m + 3n$ C. $-6m + n$ D. $-6m - 3n$

2. Simplify $3ab - 2a^2 + 2ab + b^2$

A. $ab + b^2 - 2a^2$ B. $5ab - a^2b^2$
 C. $5ab + b^2 - 2a^2$ D. $b^2 - 2a^2 - ab$

3. Expand $4x(2 - 5x)$

A. $42x - 45x^2$ B. $-12x$ C. $-12x^2$ D. $8x - 20x^2$

4. Expand $-2a(3a - 4z)$

A. $-6a + 8az$ B. $6a^2 - 8az$
 C. $-6a^2 - 8az$ D. $-6a^2 + 8az$

5. Expand $3m(2n - 3m)$

A. $mn - m^2$ B. $32mn - 33m^2$ C. $5mn - 6m^2$ D. $6mn - 9m^2$

6. Expand and simplify $4z^2 - 4z(8 - 5z) + z^2$

A. $15z^2 - 32z$ B. $25z^2 - 32z$ C. $-15z^2 - 32z$ D. $-25z^2 + 32z$

7. Expand and simplify $3p(p - 4r) - (p^2 - 4rp)$

A. $2p^2 - 8pr$ B. $4p^2 - 8pr$ C. $2p^2 - 16pr$ D. $4p^2 + 16pr$

8. Expand and simplify $(a - 2)(a - 4)$

A. $a^2 - 6a - 8$ B. $a^2 + 6a - 8$ C. $a^2 - 8a + 6$ D. $a^2 - 6a + 8$

9. Expand and simplify $(y - 6)(y + 9)$

A. $y^2 + 6y - 15$ B. $y^2 + 3y - 54$ C. $y^2 - 15y - 54$ D. $y^2 - 3y + 54$

Algebraic Products Test

10. Expand and simplify $(y - 3w)(w - 4y)$

- A. $11wy - 4y^2 - 3w^2$ B. $13wy + 4y^2 + 3w^2$
C. $11wy + 4y^2 + 3w^2$ D. $13wy - 4y^2 - 3w^2$
-

11. Expand and simplify $(3c - d)(2c - 5e)$

- A. $6c^2 + 15ce - 2cd + 5ed$ B. $6c^2 - 15ce - 2cd - 5ed$
C. $6c^2 - 15ce + 2cd + 5ed$ D. $6c^2 - 15ce - 2cd + 5ed$
-