BA SANGAM COLLEGE

YEAR 10

MATHEMATICS

WORKSHEET 1

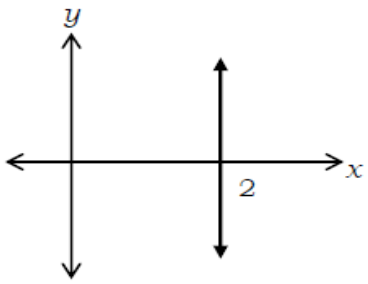
STRAND 1: RELATIONS AND FUNCTIONS

1. Which ordered pair represents $f(3) = -5$?

A. (–5, 3) B. (–3, 5)

C. (3, –5) D. (5, –3)

2. The domain of the graph shown below is



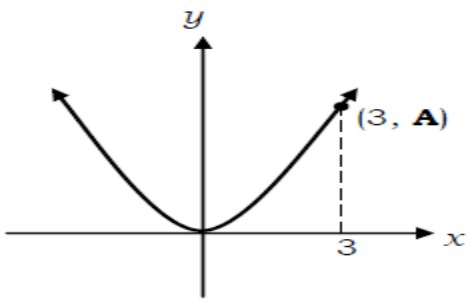
A. $\{y = 2,\ y \in R\}$ B. $\{x = 2,\ x \in R\}$

C. $\{x \geq 2,\ x \in R\}$ D. $\{x \leq 2,\ x \in R\}$

3. Find the range of the set of ordered pairs given below.

{ (–2, 2), (–1, 1) }

4. A quadratic graph $y = x^2$ is given below.



(i) One of the points shown on the graph is (3, **A**). Find the value of **A**.

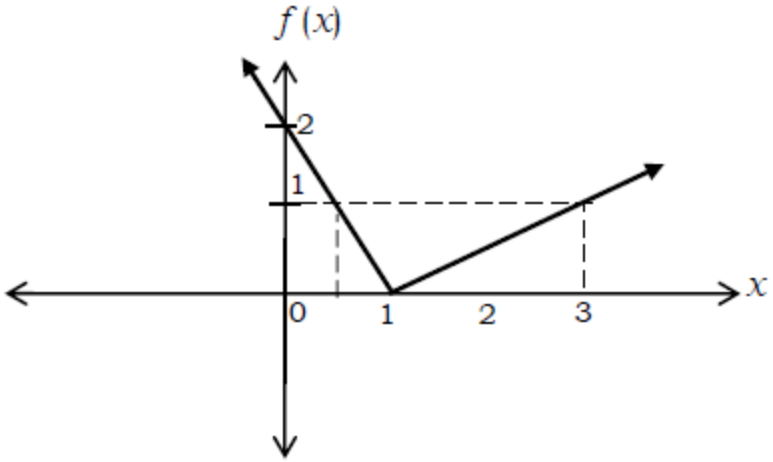
(ii) Identify **one** of the properties of this quadratic graph.

5. A relation is given as $y = 3 - 2x$, where $x \in \{-1, 0\}$.

(i) List the ordered pairs of this relation.

(ii) Is the relation a function? Give a reason for your answer.

6. The graph of a function, $f(x)$ is given below:

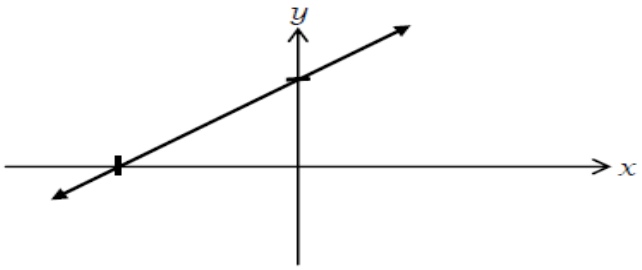


(i) What is the value of $f(0)$?

(ii) Solve for x if $f(x) = 1$.

(iii) What is the range of the relation, $f(x)$?

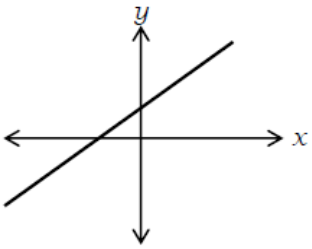
7. A line $3y \quad 2x \quad 6$ is shown below.



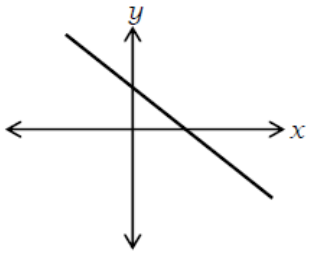
The y – intercept of the line is:

8. Which of the following lines has a zero gradient?

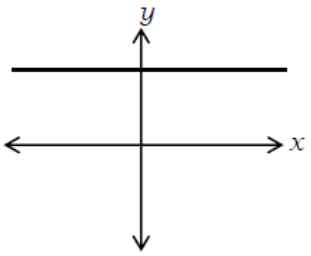
A.



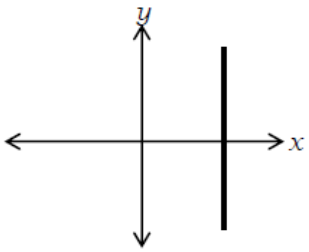
B.



C.



D.



9. An inequality is given as $x \quad 4y \leq 4$.

(i) Find the x – intercept and y – intercept of the equation $x+4y=4$.

(ii) Draw the inequality on a **cartesian** plane.

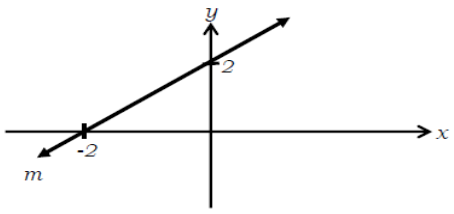
10.

If $f(x) = x^2 - 7x + 2$, what is $f(2)$?

A. –10 B. –8

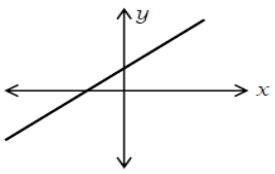
C. 4 D. 32

11. The coordinates of the x - intercept of line m given below are

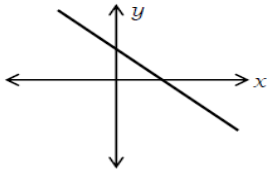


12. Which of the following lines has a positive gradient?

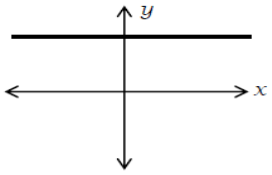
A.



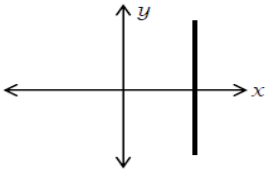
B.



C.



D.



13. Which of the relations below is a function?

A. { (0,0), (1,1), (2,2), (2,3),(4,4) }

B. { (2,1), (2,2), (2,3), (2,4), (2,5) }

C. { (0,2), (0,3), (0,4), (0,5), (0,6) }

D. { (1,1), (2,1), (3,1), (4,1), (5,1) }

14. Find the domain of the set of ordered pairs given below.

{ (1, 3), (2, 3), (3, 4), (4, 5) }

15. A quadratic function is given as $y = x^2$, where $x \in \{-2, -1, 0, 1, 2\}$.

(a) Complete the table given below:

x	y
– 2	4
– 1	1
0	0
1	
2	

(b) Use the table above to sketch the graph of $y = x^2$.

16. Consider the graph shown below.

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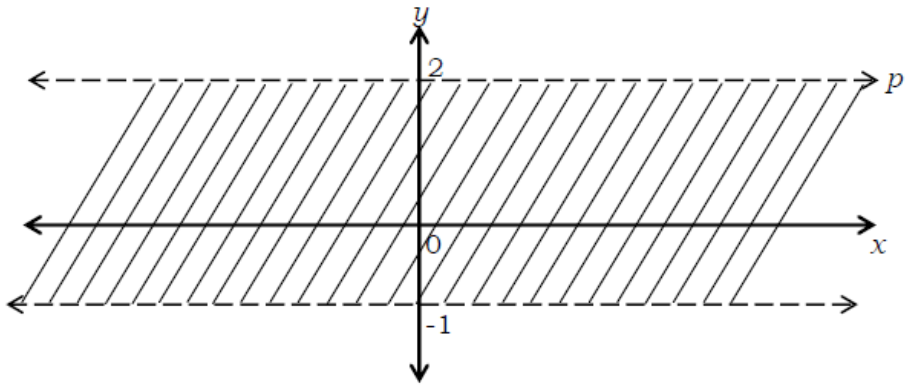


(a) What is the equation of line p?

(b) Give the inequality of the shaded region.

17.

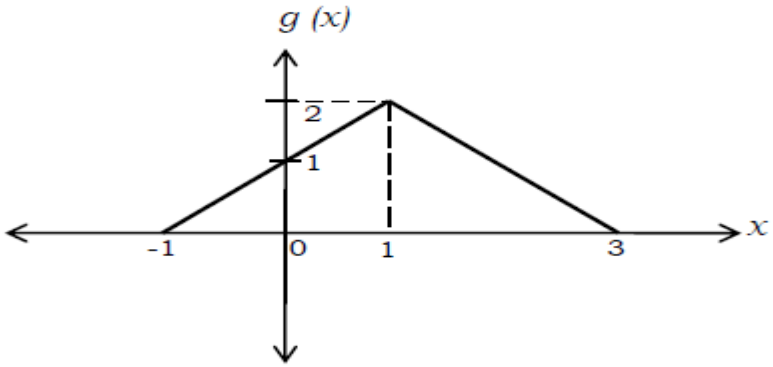
A relation is given as $y = -x + 2$, where $x \in \{-1, 0, 1\}$

(i) List the ordered pairs of this relation.

(ii) List the ordered pairs of the inverse relation.

(iii) Is the inverse of the relation a function? Give a reason for your answer.

The graph of a relation, $g(x)$ is given below:



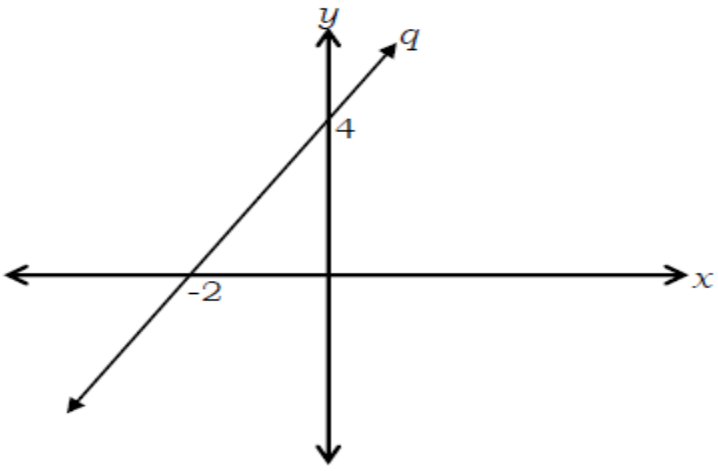
(i) What is the value of $g(0)$?

(ii) Solve for x if $g(x) = 0$.

(iii) What is the range of the relation, $g(x)$?

19.

Line q is given below.



(i) Find the coordinates of y – intercept.

(ii) Find its gradient.

(iii) Determine the equation of Line q.

STRAND 2: ALGEBRA

1. Expand **$(1 + 6c)^2$**

2. Simplify **$-x + -3y + 2x + 4y$**

3. Completely factorise **$5 - 5x$**

4. Solve $\frac{3y}{2}$ **$- 1 = 2$**

5. If a = -2, b = -4, c= 3, find the value of **$b - a \times c$**

6. Simplify $\frac{a^2b - 2a}{a}$

7. A formula is given as **$p = a x + b$**

   a. Make "**a**" the subject of the formula
   b. Find the value of 'a' if **$p = 100$**, **$b = 10$** and **$x= 9$**

8. Factorise **$x^2 + 3x + 2x + 6$** completely

9. Expand and simplify **$p + 2(p + 3)$**

10. i. Simplify $\frac{a^2 - 4}{a - 2}$

ii. State the value(s) of ‘a’ in the expression that will make the expression undefined

11. A pair of binomial is given by **(2x + 1)2x – 1)**

    I. Find the product of the given pair of binomial
    II. What special name is given to the product in (I) above?

12. Simplify

    I. $\frac{3}{x} - \frac{2x}{x^2}$

    II. $4(x+1) - 3(x+1)$

13. Three more than three times a number x is 24.

    I. Write a **mathematical equation** for the above information
    II. **Solve** the equation to find the value of x

14. Solve the inequality given by $\frac{-2x-1}{5}$ **< -3**

15. Expand **$(1 - 2a)^2$**

16. Simplify **-5x – y + 5 + 6x + y**

17. Solve **3(x + 2) = -3**

18. Completely factorise **$3x^2 - 27$**

19. Subtract **-3x – 2y** from **-3x + 10y**

20. Simplify $\mathbf{x - \frac{2x}{5}}$

21. SOLVE **y + 2 = 100 – 2y**

22. A formula is given as $\mathbf{K = \frac{1}{2} mv^2}$

I. Make **v** the subject of the formula
II. Find the value of **v** if **K = 100** and **m = 8**

23. i. Simplify $\frac{a^2 - 16}{a - 4}$ **, a** $\neq$ **4**

ii. Give a reason for **a** $\neq$ **4**

24. If a = -2, b= $\frac{1}{4}$, c = $\frac{3}{8}$ find

a. $\frac{ab}{c}$ b. a + b + c

25. **Five less than 2 times a number x is 15.**

I. Write a mathematical equation for the above information?
II. Solve the equation to find the value of x.

26. Factorise completely **2ax + x _ 8a – 4**

27. Expand **2x (x – 1)**

28. Expand and simplify **2a + b – (a + b)**

29. If **p = 2**, **q = -4**, find **–p q**

30. Simplify $\frac{x}{2}$ **-** $\frac{3x}{4}$

31. The sum of the squares of x and x is 24. Write its equation.

32. Solve for x in :

i. $x^2 = 81$

ii. $x^2 – 5 = 31$

iii. $(x – 4)(x + 2) = 0$

iv. $x^2 – 10x = -25$

v. $(x – 2)^2 + 2 + 18$

vi. $X^2 – 64 = 0$

33. The length of the wall in the diagram shown below is three times its height. The perimeter of the wall is 24m.

(i) What is the area of the wall? (Hint –Find x first)

(ii) If 1 litre of paint covers $3m^2$, how much paint is required to paint this wall?

STRAND 3: NUMBERS

1. Simplify $(a^3b^2)^3$

2. Find the value of -3^2

3. Write the following as single index:

   a. $a^5 \times a^2$ b) $b^{-2} \div b^{-9}$

4. Simplify $\mathbf{7x^0 + (2x)^0 \times 3x^0}$

5. Simplify (leave your answer in base index form)

   i. $(4^3)^4$ **ii.** $3^3 \times 5^4$

6. Simplify $\frac{4x^2y}{xy^3}$

7. Simplify $\mathbf{a^2 . a^3}$

8. Simplify $\mathbf{2^a . 2^a}$

9. Find the value of x in **$20.46 = 10^{x}$ if $2.046 = 10^{0.3109}$**

10. Simplify $p^{8} \times p^{2}$

11. Evaluate $2^{-4} \div \frac{1}{32}$

12. Simplify and write answer as single index $\frac{5^{-2} \times 5^{6}}{5}$

13. Simplify $(3x^{2}y^{4})^{2}$

14. Express $\mathbf{4^{-1}}$ as a fraction

15. Simplify $\frac{2p^{2}t^{3}}{8pt}$

16. Simplify $a^{x} \times a^{y}$

17. Simplify $(4p^{3}q)^{2}$

18. **$9 \times 9 \times 9 \times 4 \times 4$** when written in base-index form is

A. $3^{9} \times 2^{4}$ B. $9^{3} \times 4^{2}$ C. $9^{2} \times 4^{3}$ D. $9^{4} \times 4^{9}$

19.

If $a = 3$, the value of $a^2 - 2$ is

A. -2 B. 3

C. 7 D. 9

20.

$\sqrt{9x^2}$ is equal to

A. $6x^2$ B. $9x$

C. $3x$ D. $3x^2$

21.

$3x^0$ can be simplified to

A. 3 B. 2

C. 1 D. 0

22.

The value of $\left(4^2\right)^3$ in base – index form is equal to

A. 4^8 B. 4^6

C. 4^5 D. 4^2

23.

$a \times a \times a \times b \times b$ in base – index form is

A. $3a + 2b$ B. $5ab$

C. $3ab^2$ D. a^3b^2

24.

The expression 2^{-2} can be simplified to

A. 4 B. $\frac{1}{4}$

C. $-\frac{1}{4}$ D. -4

25.

Simplify:

(i) $3p^2 \times p^2$

(ii) $\frac{12a^3c}{4ac}$

26.

The value of $(3^4)^2$ in base – index form is equal to

A. 3^8 B. 3^6

C. 3^4 D. 3^2

27.

$\sqrt{16x^2}$ is equal to

A. $16x$ B. $8x$

C. $4x$ D. $2x$

28.

$(2x)^0 + 5(x)^0$ can be simplified to

A. 7 B. 6

C. 5 D. 2

29.

The expression $\left(\frac{1}{3}\right)^2$ can be simplified to

A. 9 B. $\frac{1}{9}$

C. $-\frac{1}{9}$ D. -9

30.

The expression $\frac{12a^3c}{4ac}$ can be simplified to:

A. $8a^2$ B. $3a^2$

C. $3a^3$ D. $3a^3c$