

Linear relations

Multiple Choice

Identify the choice that best completes the statement or answers the question.

$$P = 7(9) + 6$$

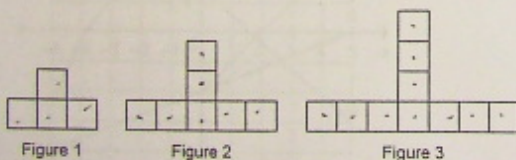
$$= 63 + 6$$

$$= 69$$

1. In the equation  $P = 7n + 6$ , determine the value of  $P$  when  $n = 9$ .  
 a. 69      b. 22      c. 105      d. 96
2. In a table of values for a pattern,  $P = 12$  when  $n = 3$ . Determine the equation that might represent the pattern.  
 a.  $P = 4n + 6$       b.  $P = 24 - 3n$       c.  $P = 4(6 - n)$       d.  $P = 4(n + 6)$
3. The pattern in this table continues. Determine the expression that relates the number of triangles to the figure number.

Figure, $f$	1	2	3	4	5
Number of Triangles, $t$	2	4	6	8	10

- a.  $2f$       b.  $2 + t$       c.  $2t$       d.  $2 + f$
4. This pattern of unit squares continues. Which equation below relates the number of squares,  $n$ , to the figure number,  $f$ ?



- i)  $n = 3f + 4$   
 ii)  $n = 3f + 1$   
 iii)  $f = 3n + 1$   
 iv)  $f = 4 + 3n$

- a. iii      b. ii      c. iv      d. i

Hint:

$x$	$y$
$f$	$n$
1	3
2	7
3	10

$m = 3$

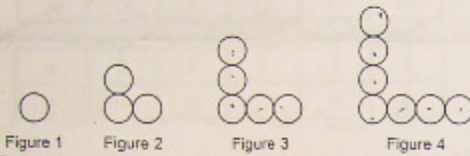
$b = 1$

$y = 3x + 1$

$n = 3f + 1$

$c = 0.555 + 6.55$

5. The cost to print stickers is \$6.55, plus \$0.55 per sticker.  
 Determine an equation that relates the total cost,  $C$  dollars, to the number of stickers,  $s$ .  
 a.  $C = 0.55s$     b.  $C = 6.55 + s$     **c.  $C = 6.55 + 0.55s$**     d.  $C = 7.1s$
- B** 6. The cost to rent a piece of equipment is \$24, plus \$8.27 per hour.  
 Calculate the cost of renting the equipment for 6 h.  
 a. \$1190.88    **b. \$73.62**    c. \$193.62    d. \$38.27
- A** 7. Determine an equation that relates the number of circles,  $C$ , to the figure number,  $n$ .



- A** a.  $C = 2n - 1$     b.  $C = n \times n - 1$     c.  $C = 2n + 1$     d.  $C = n + 1$

$$y = 8.27h + 24$$

$$y = 8.27(6) + 24$$

$$y = 73.62$$

$C = 2n - 1$

$n$	$C$
1	1
2	3
3	5
4	7

8. The pattern in this table continues. Determine an equation that relates the term value to the term number.

Term Number, $s$	1	2	3	4	5
Term Value, $w$	6	10	14	18	22

- a.  $w = 4s + 2$     b.  $w = 6s$     c.  $w = 3s + 2$     d.  $w = 2s + 4$

$$w = 4s + 2$$

- B** 9. A pattern can be represented by the equation  $H = 6n - 1$ .

Which equations could represent the same pattern?

- i)  $H = 6(n - 1) + 5$   
 ii)  $H = 5(n + 1) + n$   
**iii)  $H = 7n - (n + 1)$**   
 iv)  $H = 5n - (1 - n)$

$$H = 6n - 6 + 5 = 6n - 1$$

$$7n - n - 1 = 6n - 1$$

$$5(n+1) + n = 5n + 5 + n = 6n + 5$$

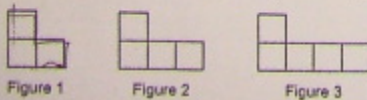
$$5n - 1 + n = 6n - 1$$

$$5n + 5 + n = 6n + 5$$

$$P = 1n + 2$$

- a. i, ii, and iii    **b. i, iii, and iv**    c. i, ii, and iv    d. All of these

- iii** 10. This pattern of unit squares continues.  
 Which equation below relates the perimeter,  $P$ , to the figure number,  $n$ ?

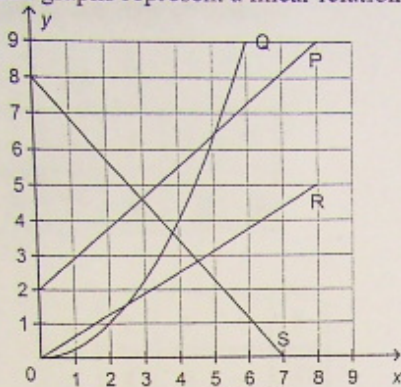


- i)  $P = 6n + 2$   
 ii)  $P = 2n + 4$   
**iii)  $P = 2n + 6$**   
 iv)  $P = 2n + 8$

$P = 2n + 6$

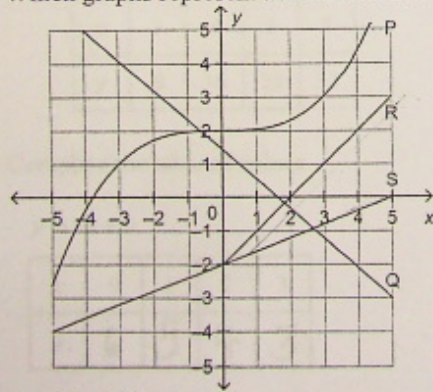
$n$	$P$
1	8
2	10
3	12

B 11. Which graphs represent a linear relation?



- a. P only      b. P, R, and S      c. P and S      d. P and R

B 12. Which graphs represent a linear relation?



- a. P and R      c. Q and S  
b. Q, R, and S      d. Q and R

**A** 13. Which tables of values represent a linear relation?

~~i)~~

x	1	2	3	4	5
y	4	7	12	19	28

ii)

x	0	1	2	3	4
y	0	5	10	15	20

iii)

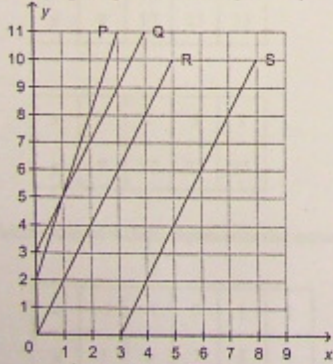
x	1	2	3	4	5
y	5	9	13	17	21

iv)

x	0	1	2	3	4
y	12	11	10	9	8

- a. ii, iii, and iv      b. ii and iii      c. All of these      d. i and iv

**B** 14. Which graph represents the equation  $y = 2x + 3$ ?



- a. Line S      **b. Line Q**      c. Line P      d. Line R

D 15. Complete the table of values.

$y = 9 - 5x$

x	2	4	6	8
y	-1	-11	-21	-31

$y = 9 - 5(2)$   
 $y = 9 - 10$   
 $= -1$

$y = 9$

a.

x	2	4	6	8
y	4	-1	-6	-11

c.

x	2	4	6	8
y	4	8	12	16

b.

x	2	4	6	8
y	8	16	24	32

d.

x	2	4	6	8
y	-1	-11	-21	-31

C 16. Complete the table of values.

$y = -x + 6$

x	0	1	2	3
y	6	5	4	3

a.

x	0	1	2	3
y	-6	-7	-8	-9

c.

x	0	1	2	3
y	6	5	4	3

**A** 17. This table of values represents a linear relation. Complete the table.

x	1	3	5	7
y	9	17	25	33

a.

x	1	3	5	7
y	9	17	25	33

b.

x	1	3	5	7
y	9	17	21	25

c.

x	1	3	5	7
y	9	17	19	21

d.

x	1	3	5	7
y	9	17	45	63

**B** 18. Which table of values represents the equation  $y = 11 - 4x$ ?

a.

x	-2	-1	0	1	2
y	5	6	7	8	9

b.

x	-2	-1	0	1	2
y	19	15	11	7	3

c.

x	-2	-1	0	1	2
y	3	7	11	15	19

d.

x	-2	-1	0	1	2
y	-14	-7	0	7	14

$y = 11 - 4(-2)$   
 $y = 11 + 8$   
 $y = 19$

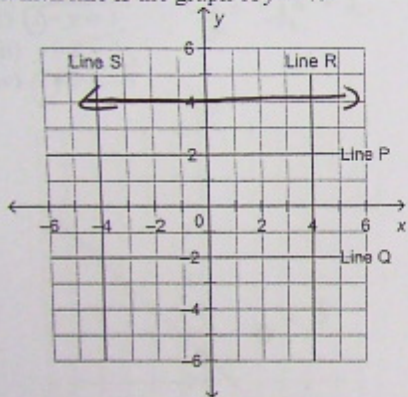
19. Sean cycles at an average speed of 5 m/s. He travels a distance,  $d$  metres, in  $t$  seconds. Write an equation that relates  $d$  and  $t$ .

- a.  $d = \frac{t}{5}$       b.  $d = t + 5$       c.  $d = 5t$       d.  $t = 5d$

20. Which points lie on the graph represented by the equation  $y = 14 - 5x$ ?  
 $P(1, 9)$ ,  $Q(2, 18)$ ,  $R(2, 4)$ ,  $S(0, 9)$

- a. P and Q      b. Q and R      c. R and S      d. P and R

21. Which line is the graph of  $y = 4$ ?



- a. Line S      b. Line P      c. Line Q      d. Line R

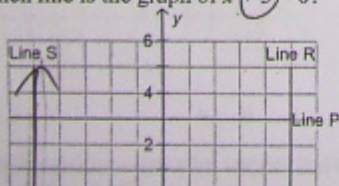
$y = 14 - 5(2)$   
 $y = 14 - 10$   
 $y = 4$

$y = 14 - 5(1)$   
 $= 14 - 5$   
 $= 9$

$y = 14 - 5(0)$   
 $y = 14 - 30$   
 $y = -16$

$y = 14 - 0$   
 $y = 14$

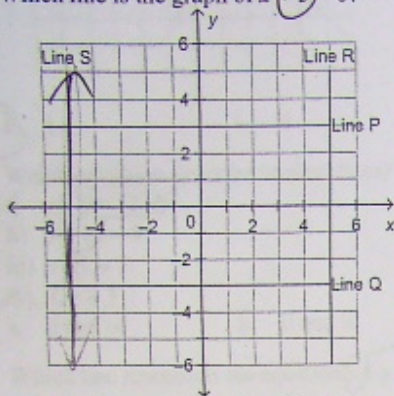
22. Which line is the graph of  $x + 5 = 0$ ?



$x = -5$

e. none of the above

D 22. Which line is the graph of  $x + 5 = 0$ ?  $x = -5$ .



- a. Line R      b. Line Q      c. Line P      d. Line S

A 23. For the equation  $4x - 2y = 8$ , make a table of values for  $x = -2, 0,$  and  $2$ .

a.

x	-2	0	2
y	-8	-4	0

b.

x	-2	0	2
y	-8	0	1

c.

x	-2	0	2
y	8	4	1

d.

x	-2	0	2
y	0	-4	8

Handwritten work for question 23:

$$4x - 2y = 8$$

$$-2y = -4x + 8$$

$$\frac{-2y}{-2} = \frac{-4x + 8}{-2}$$

$$y = 2x - 4$$

$$y = 2(-2) - 4$$

$$= -4 - 4$$

$$y = 2(0)$$

$$y = 0$$

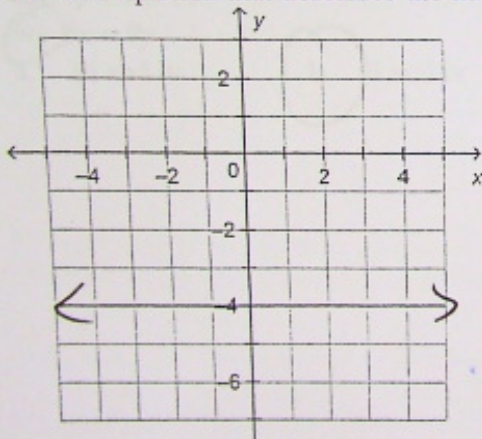
C 24. Describe the graph of the equation  $x + 7 = 0$ .  $x = -7$

- a. A vertical line that intersects the x-axis at 7.  
 b. A horizontal line that intersects the y-axis at -7.  
c. A vertical line that intersects the x-axis at -7.  
 d. A horizontal line that intersects the y-axis at 7.



24. Describe the graph of the equation  $x + 7 = 0$ .  $x = -7$
- a. A vertical line that intersects the x-axis at 7.
  - b. A horizontal line that intersects the y-axis at  $-7$ .
  - c. A vertical line that intersects the x-axis at  $-7$ .
  - d. A horizontal line that intersects the y-axis at 7.

A 25. Write an equation that describes the line.



- a.  $y = -4$
- b.  $x = 4$
- c.  $y = 4$
- d.  $x = -4$

A 26. Which equation describes a horizontal line?

- i)  $x+9=2$
- ii)  $y+5=9$
- iii)  $y-x=0$
- iv)  $y+2=9-2$

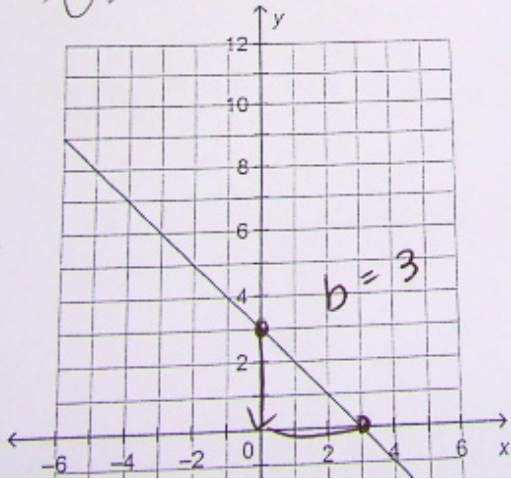
$y = -x + 9$   
 $y = x$   
 $y = 7$

- a. iv
- b. ii
- c. i
- d. iii

A 27. Which equation describes the graph?

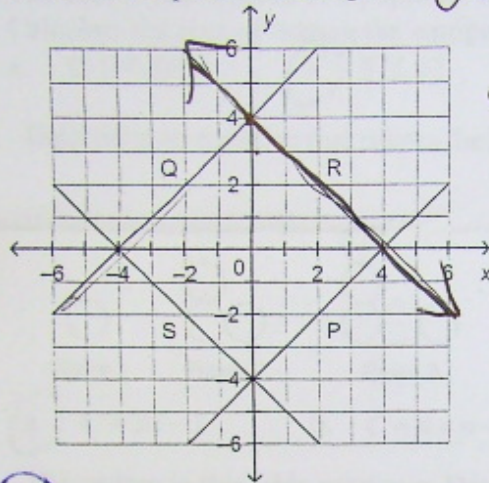
- i)  $x+y=3$
- ii)  $-y=3$
- iii)  $y-x=3$
- iv)  $x-y=-3$

$y = -x + 3$   
 $-y = -1x + 3 \Rightarrow y = 1x - 3$



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

A 29. Which line represents the equation  $x + y = 4$ ?



$y = -x + 4$

- a.  Line R      b.  Line S      c.  Line P      d.  Line Q

B 30. Which equations describe oblique lines?

- i)  $5x + 9 = 14$
- ii)  $5x + 9y = 14$
- iii)  $9y + 5 = 14$
- iv)  $5x = 9y$

- a.  iii and iv      b.  ii and iv      c.  i and iii      d.  i and iv