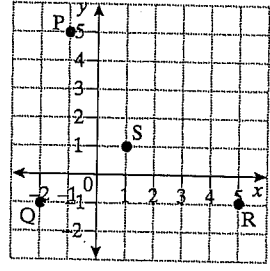


Mini Test 22: Algebra

- 1 Which expression is equivalent to  $-5x + 3$ ?  
 A  $-2x$                       B  $-3 + 5x$   
 C  $5x - 3$                     D  $3 - 5x$
- 2 When  $t = -2$ , what is the value of  $3t^2$ ?  
 A 12    B -12    C 36    D -36
- 3 The smallest number in a set of three consecutive whole numbers is given the value  $x$ . What is the value of the largest number in the set?  
 A  $z$     B  $x + 2$     C  $x + 3$     D  $x + 4$
- 4  $7p - 2 = 3p + 6$   
 What value of  $p$  will satisfy this equation?     $p =$
- 5  $3(2a - 2) + 5a + 4 =$   
 A  $10a + 2$                     B  $10a + 10$   
 C  $11a - 2$                     D  $11a + 2$
- 6 A rule for  $y$  in terms of  $x$  is  $y = 3x + 5$ .  
 If  $y = 38$ , what is the value of  $x$ ?     $x =$
- 7 In a certain situation, the inequality  $y > 3x - 7$  is true for all values of  $x$  between 1 and 12. Which pair of values **does not** satisfy the inequality?  
 A  $x = 10$  and  $y = 24$     B  $x = 5$  and  $y = 10$   
 C  $x = 2$  and  $y = 0$     D  $x = 7$  and  $y = 12$
- 8 Which expression is **not** equivalent to  $3x^2 + 7x - 4$ ?  
 A  $7x - 4 + 3x^2$             B  $-4 + 7x + 3x^2$   
 C  $4 - 7x - 3x^2$             D  $3x^2 - 4 + 7x$
- 9  $5m + 4 = 3m - 8$   
 What is the value of  $m$ ?  
 A -6    B -2    C  $-1\frac{1}{2}$     D 2
- 10 Which of these points lies on the straight line joining (3, 4) and (14, 15)?  
 A (6, 5)    B (10, 11)    C (9, 12)    D (8, 8)
- 11  $x + y = 7$   
 $x - y = 3$   
 Which values of  $x$  and  $y$  satisfy both these equations?  
 $x =$   and  $y =$

- 12 It is known that, for all values of  $x$ ,  
 $4(5x - 1) + 3 + \boxed{?} = 15x - 1$   
 What is the missing term?
- 13 If  $k = -3$ , what is the value of  $k^2 - 4k$ ?  
 A -3    B -21    C 3    D 21
- 14 Consider this pattern:  
 $2^2 = 0 \times 4 + 4$   
 $3^2 = 1 \times 5 + 4$   
 $4^2 = 2 \times 6 + 4$   
 $5^2 = 3 \times 7 + 4$   
 $6^2 = 4 \times 8 + 4$   
 Using this pattern, what is the **value** of  $98^2$ ?
- 15 The graph of  $y = 3 - 2x$  is to be drawn on this grid.



- Through which two points will the line pass?  
 A P and Q                      B Q and R  
 C P and S                      D Q and S
- 16 The rule to change temperatures in degrees Celsius ( $^{\circ}\text{C}$ ), to temperatures in degrees Fahrenheit ( $^{\circ}\text{F}$ ) is  $F = \frac{9}{5}C + 32$   
 The maximum temperature today was  $35^{\circ}\text{C}$ . What is this in degrees Fahrenheit?      $^{\circ}\text{F}$
- 17 It is known that  $\frac{3}{4} > \frac{2}{x}$  where  $x$  is a positive whole number. What is the smallest possible value of  $x$ ?
- 18 Which expression is equivalent to  $\frac{x^2}{3} + \frac{2x^2}{3}$ ?  
 A  $x^2$     B  $x^4$     C  $\frac{x^2}{2}$     D  $\frac{x^4}{2}$

1 D 2 A 3 B 4  $p = 2$  5 C 6  $x = 11$  7 D  
 8 C 9 A 10 B 11  $x = 5$  and  $y = 2$  12  $-5x$   
 13 D 14 9604 15 C 16  $95^\circ\text{F}$  17 3 18 A

1  $-5x + 3 = 3 - 5x$

[Simply rearranging the terms.]

2  $3t^2 = 3 \times t^2$

When  $t = -2$ ,

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

$$= 3 \times 4$$

$$= 12$$

3 [Consecutive numbers are numbers following one another like 17, 18 and 19.]

If  $x$  is the first number, the second number is  $x + 1$  and the third number is  $x + 2$ .

The largest number in the set is  $x + 2$ .

4  $7p - 2 = 3p + 6$

[Add 2 to both sides.]

$$7p = 3p + 8$$

[Subtract  $3p$  from both sides.]

$$4p = 8$$

[Divide by 4.]

$$p = 2$$

5  $3(2a - 2) + 5a + 4 = 6a - 6 + 5a + 4$

$$= 6a + 5a - 6 + 4$$

$$= 11a - 2$$

6  $y = 3x + 5$

If  $y = 38$ ,

$$38 = 3x + 5$$

[Subtract 5 from both sides.]

$$33 = 3x$$

[Divide both sides by 3.]

$$11 = x$$

So  $x = 11$

7  $y > 3x - 7$

Try each option:

$x = 10$  and  $y = 24$

$$24 > 3 \times 10 - 7$$

$$24 > 23$$

This option is correct.

$x = 5$  and  $y = 10$

$$10 > 3 \times 5 - 7$$

$$10 > 8$$

This option is correct.

$x = 2$  and  $y = 0$

$$0 > 3 \times 2 - 7$$

$$0 > -1$$

This option is correct.

$x = 7$  and  $y = 12$

$$12 > 3 \times 7 - 7$$

$$12 > 14$$

This option is not correct.

The pair of values that does not satisfy the inequality is  $x = 7$  and  $y = 12$ .

8  $3x^2 + 7x - 4$

Try each option:

$$7x - 4 + 3x^2 = 3x^2 + 7x - 4$$

This option is correct.

$$-4 + 7x + 3x^2 = 3x^2 + 7x - 4$$

This option is correct.

$$4 - 7x - 3x^2 = -3x^2 - 7x - 4$$

$$= -(3x^2 + 7x + 4)$$

This option is not correct.

$$3x^2 - 4 + 7x = 3x^2 + 7x - 4$$

This option is correct.

The expression that is not equivalent to  $3x^2 + 7x - 4$  is  $4 - 7x - 3x^2$

9  $5m + 4 = 3m - 8$

[Subtract 4 from both sides.]

$$5m = 3m - 12$$

[Subtract  $3m$  from both sides.]

$$2m = -12$$

[Divide both sides by 2.]

$$m = -6$$

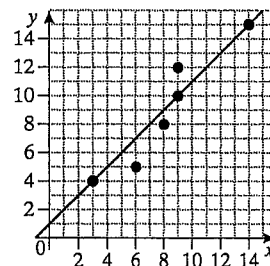
[Or try each option to see which satisfies the equation.]

10 (3, 4) and (14, 15)

The  $y$ -value is one more than the  $x$ -value.

[So they will both lie on the line  $y = x + 1$ .]

Of the options, the only point with its  $y$ -value one more than its  $x$ -value is (10, 11) so this point will lie on the line.



11  $x + y = 7$

$$x - y = 3$$

[Add the two equations together and  $y$  will be eliminated.]

$$2x = 10$$

[Divide by 2.]

$$x = 5$$

So  $5 + y = 7$

[Subtract 5 from both sides.]

$$y = 2$$

So  $x = 5$  and  $y = 2$

[Check:  $5 + 2 = 7$ ;  $5 - 2 = 3$ ]

12  $4(5x - 1) + 3 + \boxed{?} = 15x - 1$

$$20x - 4 + 3 + \boxed{?} = 15x - 1$$

$$20x - 1 + \boxed{?} = 15x - 1$$

[Add 1 to both sides.]

$$20x + \boxed{?} = 15x$$

But  $20x - 5x = 15x$ .

So the missing term is  $-5x$ .

13 If  $k = -3$ ,

$$k^2 - 4k = (-3)^2 - 4 \times (-3)$$

$$= 9 + 12$$

$$= 21$$

14  $2^2 = 0 \times 4 + 4$   
 $3^2 = 1 \times 5 + 4$   
 $4^2 = 2 \times 6 + 4$   
 $5^2 = 3 \times 7 + 4$   
 $6^2 = 4 \times 8 + 4$

[The first number on the right-hand side is two less than the number that is squared on the left-hand side. The second number is two more than the number that is squared.]

Using the pattern:

$$98^2 = 96 \times 100 + 4$$

$$= 9600 + 4$$

$$= 9604$$

15  $y = 3 - 2x$   
P is the point  $(-1, 5)$ .  
When  $x = -1$ ,  
 $y = 3 - 2 \times -1$   
 $= 3 + 2$   
 $= 5$

So P lies on the line.

Q is the point  $(-2, -1)$ .

When  $x = -2$ ,  
 $y = 3 - 2 \times -2$   
 $= 3 + 4$   
 $= 7$  (not  $-1$ )

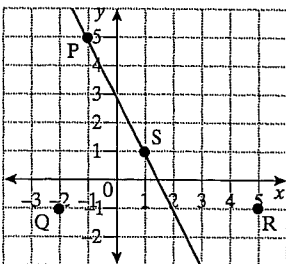
So Q does not lie on the line.

S is the point  $(1, 1)$ .

When  $x = 1$ ,  
 $y = 3 - 2 \times 1$   
 $= 1$

So S lies on the line.

The line passes through P and S.



16  $F = \frac{9}{5}C + 32$

When  $C = 35$ ,

$$F = \frac{9}{5} \times 35 + 32$$

$$[35 \div 5 = 7; 9 \times 7 = 63]$$

$$F = 63 + 32$$

$$= 95$$

The temperature would be  $95^\circ\text{F}$ .

17  $\frac{3}{4} > \frac{2}{x}$

[Multiply both sides by  $4x$ .]

$$3x > 8$$

[Divide by 3.]

$$x > 2\frac{2}{3}$$

But  $x$  is a whole number.

The smallest possible value of  $x$  is 3.

18  $\frac{x^2}{3} + \frac{2x^2}{3} = \frac{3x^2}{3}$   
 $= x^2$