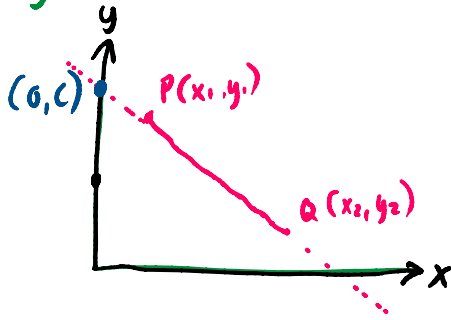# The equation of a line : $y = mx + c$

24 September 2019   14:57

Pg 18

$(0, c)$ where the line cuts the y axis

the y intercept

On the y axis $x = 0$

$c \rightarrow$ will be the value of y.

Formula

$y = mx + c$

$m = $ slope

m is the coefficient of x

$c \rightarrow$ y intercept (where the line cuts the y axis)

T&T2 11.4
The...

T&T2 11.4
The...

11 Coordinate Geometry – The Line

Section 11.4 The equation $y = mx + c$

215

Example 1

Find the slope of the line $3x - 2y - 9 = 0$.

Example 2

ℓ is the line $2x - 3y + 6 = 0$ and k is the line $3x + 2y - 4 = 0$.
Show that ℓ is perpendicular to m.

Exercise 11.4

m / $y = mx + c$

1. Write down the slope of each of these lines:

    (i) $y = 3x + 5$ (ii) $y = 2x - 3$ (iii) $y = \frac{1}{2}x + 4$

$m = 3$

y intercept = 5

$(0, 5)$

$m = 2$ slope

y intercept -3

$(0, -3)$

$m = \frac{1}{2}$

y intercept 4

$(0, 4)$

1. Write down the slope of each of these lines:

   (i) $y = 3x + 5$ (ii) $y = 2x - 3$ (iii) $y = \frac{1}{2}x + 4$

2. Write down the coordinates of the point where each of the lines in Question 1 above intersects the y-axis.

Pg 216.
H/W Q3 finish

3. Express each of the following lines in the form $y = mx + c$ and hence write down the slope of the line: *Rearrange*

   (i) $x + y - 4 = 0$ (ii) $3x + y - 5 = 0$ (iii) $2x + 3y - 7 = 0$

   $-x$ | $y - 4 = x$ | $-x$
   $+4$ | $y = -x + 4$ | $+4$

   Slope = -1

   (iv) $5x - 2y + 3 = 0$ (v) $3x + 4y - 2 = 0$ (vi) $3x - 4y + 6 = 0.$

4. Express the line $\ell: 2x + 3y - 7 = 0$ in the form $y = mx + c$.

   (i) Write down the slope of ℓ.

  (ii) What is the slope of any line parallel to ℓ?

 (iii) What is the slope of any line perpendicular to ℓ?

5. Show that the lines $x - 2y + 1 = 0$ and $3x - 6y - 7 = 0$ are parallel.
What is the slope of any line perpendicular to these lines?

6. Show that the lines $2x + 3y - 4 = 0$ and $3x - 2y + 1 = 0$ are perpendicular to each other.

7. If the equation of the line ℓ is $y = 3x - 4$, write down the equation of any line, in the form $y = mx + c$, that is
    (i) parallel to ℓ (ii) perpendicular to ℓ.

8. Investigate if the lines $y = \frac{2}{3}x + 4$ and $2x - 3y - 5 = 0$ are parallel.

9. (i) Match the equations below to give four pairs of parallel lines:

A $\quad y = \frac{1}{2}x + 1$

B $\quad y = \frac{1}{3}x + 5$

C $\quad y = -\frac{3}{4}x + 3$

D $\quad y = \frac{x}{5} - 1$

E $\quad y = 9 + \frac{1}{2}x$

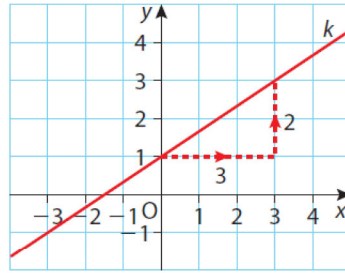**F** $\quad y = \frac{x}{3} - 2$

G $\quad y = \frac{1}{5}x + 3$

H $\quad y = \frac{4}{3}x + 2$

I $\quad y = 1 - \frac{3}{4}x$

(ii) Which equation is the odd one out?

10. (i) Write down the slope of the given line k.

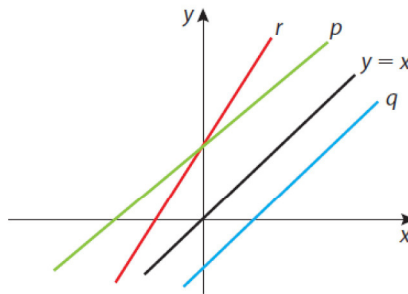(ii) Write the equation of k in the form $y = mx + c$.

11. The lines labelled p, q, and r match these equations:
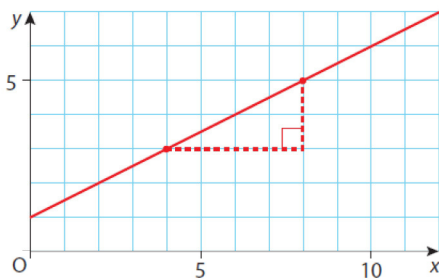
$y = 2x + 5$

$y = x + 5$

$y = x - 2$

Match each line to its correct equation.

12. By finding the slope and y-intercept, write down the equation of the given line.

13. The equations of six lines are given below:

a: $y = 2x - 3$ c: $y = x + 3$ e: $y = -\frac{1}{2}x + 4$

b: $y = \frac{1}{2}x + 5$ d: $y = -2x - 4$ f: $y = 2x - 2$

(i) Name a pair of parallel lines.   (ii) Name a pair of perpendicular lines.

(iii) Which line crosses the y-axis at $(0, 4)$?   (iv) Which line crosses the y-axis at $(0, -3)$?

14. If the line $x + 2y - 6 = 0$ is parallel to the line $2x + ky - 5 = 0$, find the value of k.

15. If the line $2x - 3y + 7 = 0$ is perpendicular to the line $3x + ky - 4 = 0$, find the value of k.

16. Find the equation of each line sketched below:

(i)

(2, 7)

3

(ii)

(4, 6)

2

−2

(iii)

(2, 3)

−3
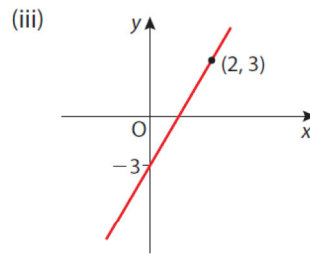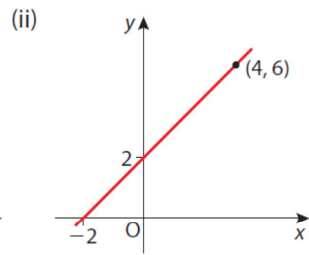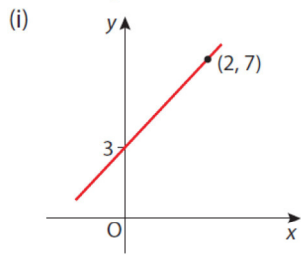
17. Which two of these lines are parallel to $y = \frac{1}{2}x - 3$?

A $2y = x + 2$

B $2x = y + 10$

C $2y + 8 = x$

D $y - 2x = 9$

Answers

Exercise 11.4

1. (i) 3   (ii) 2   (iii) $\frac{1}{2}$

2. (i) (0, 5)   (ii) (0, −3)   (iii) (0, 4)

3. (i) $y = -x + 4; -1$ (ii) $y = -3x + 5; -3$

    (iii) $y = -\frac{2}{3}x + \frac{7}{3}; -\frac{2}{3}$ (iv) $y = \frac{5}{2}x + \frac{3}{2}; \frac{5}{2}$

    (v) $y = -\frac{3}{4}x + \frac{1}{2}; -\frac{3}{4}$ (vi) $y = \frac{3}{4}x + \frac{3}{2}; \frac{3}{4}$

4. $y = -\frac{2}{3}x + \frac{7}{3};$ (i) $-\frac{2}{3}$ (ii) $-\frac{2}{3}$ (iii) $\frac{3}{2}$

5. −2

7. (i) $y = 3x + c$ (ii) $y = -\frac{1}{3}x + c$

Answers

8. Yes, parallel

9. (i) A & E, B & F, C & I, D & G
   (ii) H

10. (i) $\frac{2}{3}$ (ii) $y = \frac{2}{3}x + 1$

11. $r - \boxed{y = 2x + 5}$ $p - \boxed{y = x + 5}$

    $q - \boxed{y = x - 2}$

12. $y = \frac{1}{2}x + 1$

13. (i) a & f (ii) e & f (iii) e (iv) a

14. 4

15. 2

16. (i) $y = 2x + 3$ (ii) $y = x + 2$
   (iii) $y = 3x - 3$

17. A & C