Higher Check In - 7.02 Straight line graphs

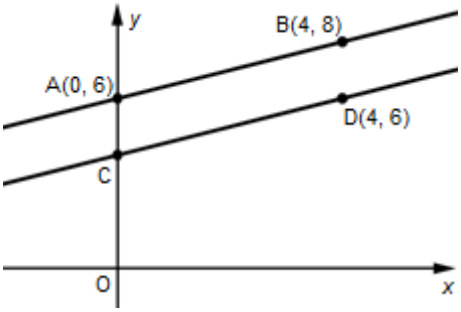
1. Write down the equation of a line parallel to $2x + 2y = -1$ that passes through the point (0, -4).

2. A line passes through (-2, 1) and (-4, -3). Find the equation of the line.

3. Which of the following lines are perpendicular to each other?

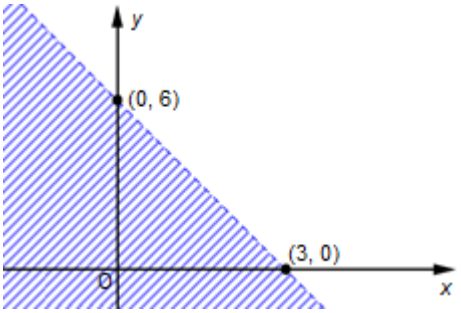
$y = 2x - 3$ $\quad y = -2x + 3$ $\quad y = -\frac{1}{2}x + 4$ $\quad y = 3x - 2$ $\quad y = -\frac{2}{3}x - 3$

4. The diagram shows two parallel lines.



Find the equation of the line through CD.

5. Write down the solution set that is represented by the shaded area.



6. The equation of line L is $y = 3x + 2$. Explain how you know that the point (11, 39) lies above the line L.

7. Show that the line perpendicular to $y = \frac{2}{3}x - 1$ that passes through the point (6, 3) intercepts the *y*-axis at $y = 12$.

8. Show that the equation of the perpendicular bisector of (-2, 1) and (4, -1) is $y = 3x - 3$.

9. The point with coordinates (*d*, 2*d*) lies on the straight line with equation $4x + 3y = 15$. Find the value of *d*.

10. The equation of the tangent to the circle $x^2 + y^2 = 25$ at the point (-4, 3) has equation $3y = ax + b$ where a and b are positive integers. Find the values of a and b.

Extension

The line $y = mx + c$ is reflected in the x-axis and then in the y-axis. What is the equation of the new line?

Answers

1. $y = -x - 4$

2. $y = 2x + 5$

3. $y = 2x - 3$ and $y = -\frac{1}{2}x + 4$

4. $y = \frac{1}{2}x + 4$

5. $y < -2x + 6$

6. Substituting $x = 11$ into the equation of L gives $3 \times 11 + 2 = 35$ which means (11, 35) lies on the line so (11, 39) must lie above the line.

7. A line perpendicular to $y = \frac{2}{3}x - 1$ has gradient $-\frac{3}{2}$ and equation $y = -\frac{3}{2}x + c$. If it passes through (6, 3) then substituting $x = 6$ and $y = 3$ gives $3 = -\frac{3}{2} \times 6 + c$ which simplifies to $3 = -9 + c$ so $c = 12$. The line intercepts the *y*-axis at 12.

8. Gradient of the line joining the two points $= \frac{-1-1}{4--2} = \frac{-2}{6} = -\frac{1}{3}$ and the midpoint of the line is $\left(\frac{4+-2}{2}, \frac{1+-1}{2}\right) = (1, 0)$. If the perpendicular bisector has a gradient of 3 and passes through (1, 0) then substituting $x = 1$ and $y = 0$ gives $0 = 3 \times 1 + c$ so $c = -3$. The equation of the perpendicular bisector is $y = 3x - 3$.

9. $d = 1.5$

10. $a = 4$, $b = 25$

Extension

After the two reflections the line has the equation $y = mx - c$.

We'd like to know your view on the resources we produce. By clicking on 'Like' or 'Dislike' you can help us to ensure that our resources work for you. When the email template pops up please add additional comments if you wish and then just click 'Send'. Thank you.

If you do not currently offer this OCR qualification but would like to do so, please complete the Expression of Interest Form which can be found here: www.ocr.org.uk/expression-of-interest

Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Find the equation of a parallel line through a given point			
AO1	2	Find the equation of a straight line through two given points			
AO1	3	Identify equations of perpendicular lines			
AO1	4	Find the equation of a parallel line through a given point			
AO1	5	Identify the solution set of a linear inequality in two variables			
AO2	6	Justify that a point lies above a line			
AO2	7	Find the *y*-intercept of a perpendicular line that passes through a given point			
AO2	8	Find the equation of a perpendicular bisector of two given points			
AO3	9	Solve a problem involving an unknown point on a straight line			
AO3	10	Find the equation of a tangent to a circle at a given point			

Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Find the equation of a parallel line through a given point			
AO1	2	Find the equation of a straight line through two given points			
AO1	3	Identify equations of perpendicular lines			
AO1	4	Find the equation of a parallel line through a given point			
AO1	5	Identify the solution set of a linear inequality in two variables			
AO2	6	Justify that a point lies above a line			
AO2	7	Find the *y*-intercept of a perpendicular line that passes through a given point			
AO2	8	Find the equation of a perpendicular bisector of two given points			
AO3	9	Solve a problem involving an unknown point on a straight line			
AO3	10	Find the equation of a tangent to a circle at a given point			

Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Find the equation of a parallel line through a given point			
AO1	2	Find the equation of a straight line through two given points			
AO1	3	Identify equations of perpendicular lines			
AO1	4	Find the equation of a parallel line through a given point			
AO1	5	Identify the solution set of a linear inequality in two variables			
AO2	6	Justify that a point lies above a line			
AO2	7	Find the *y*-intercept of a perpendicular line that passes through a given point			
AO2	8	Find the equation of a perpendicular bisector of two given points			
AO3	9	Solve a problem involving an unknown point on a straight line			
AO3	10	Find the equation of a tangent to a circle at a given point			

Assessment Objective	Qu.	Topic	R	A	G
AO1	1	Find the equation of a parallel line through a given point			
AO1	2	Find the equation of a straight line through two given points			
AO1	3	Identify equations of perpendicular lines			
AO1	4	Find the equation of a parallel line through a given point			
AO1	5	Identify the solution set of a linear inequality in two variables			
AO2	6	Justify that a point lies above a line			
AO2	7	Find the *y*-intercept of a perpendicular line that passes through a given point			
AO2	8	Find the equation of a perpendicular bisector of two given points			
AO3	9	Solve a problem involving an unknown point on a straight line			
AO3	10	Find the equation of a tangent to a circle at a given point			