Topic Check In - 7.02 Straight line graphs

Hint: You may wish to draw graphs in some questions.

Use the graph in Figure 1 to answer questions 1-3:

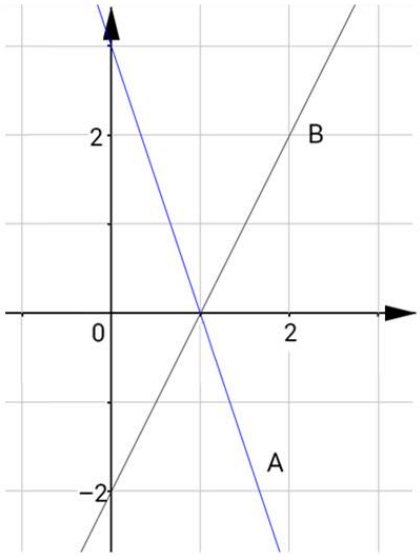


Figure 1

1. Write down the *y*-intercept for line A.

2. Write down the gradient of line B.

3. Write down the coordinates of the point where lines A and B intersect.

4. Write down the gradient of the graph of $y = 7x - 2$.

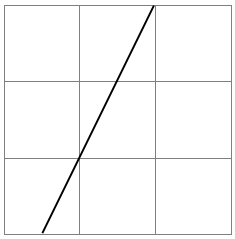
5. $y = ax + b$ passes through (0, 4).
   The line has a gradient of 3.
   Write down the value of a and the value of b.

6. The equation of line L is $y = 5x - 2$.
   Show that line L will pass through the point (20, 98).

7. Line G passes through the points (1, 7) and (3, 11).
   Show that the *y*-intercept is 5.

8. Show that the line connecting (1, 9) with (3, 13) and the line connecting (2, 3) with (5, 9) make up two sides of a trapezium.

9. This diagram shows part of the graph of a straight line.
   Each square has side length 1 unit.



   The line crosses the *y*-axis at $^{-}14$
   Find the *x*-coordinate when $y = 1$.

10. A right-angled triangle has coordinates (0, 3), (5, 3) and (5, 23). Find the equations of the three lines that pass through the vertices.

Extension

A set of straight lines pass through (0, 0) and (t, $t + 2$).

- Investigate the gradient for different values of t.
- Find, in terms of t, the equation of all possible lines in the form $y = mx + c$.

Other sets of straight lines will pass through the points (0, a) and (t, $t + 2$).

- Investigate the equation of these lines for different values of a and t.
- Find, in terms of a and t, the equation of all possible lines in the form $y = mx + c$.

Answers

1. 3
2. 2
3. (1, 0)
4. 7
5. Equation is $y = 3x + 4$ so $a = 3$, $b = 4$.
6. Using $x = 20$ gives $y = 5 \times 20 - 2 = 98$ oe.
7. Gradient is $\frac{(11-7)}{(3-1)} = 2$, so $y = 2x + c$. Substituting one of the coordinates and solving gives $c = 5$.
8. Show that each pair of points gives a line with gradient 2. Lines with the same gradient are parallel lines which could form the opposite sides of a trapezium.
9. $m = 2$ and $c = -14$ therefore $y = 2x - 14$. When $y = 1$, $x = 7.5$.
10. $y = 3$, $x = 5$ and $y = 4x + 3$

Extension

Gradient = $\frac{t+2}{t}$, y-intercept is 0 so equation is $y = \frac{t+2}{t}x$.

Gradient = $\frac{t+2-a}{t}$, y-intercept is a so equation is $y = \frac{t+2-a}{t}x + a$.

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AO1	1	Find the *y*-intercept of a line from a graph.			
AO1	2	Find the gradient of a line from a graph.			
AO1	3	Find the coordinates of the point where lines cross.			
AO1	4	Find the gradient from the equation of a line in the form $y = mx + c$.			
AO1	5	Interpret the gradient and *y*-intercept of an equation in the form $y = mx + c$.			
AO2	6	Show that a point satisfies an equation.			
AO2	7	Understand that the *y*-intercept is where $x = 0$.			
AO2	8	Calculate gradient.			
AO3	9	Interpret the gradient and *y*-intercept to determine coordinates on a line.			
AO3	10	Find equations of lines.			

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