AQA, Edexcel, OCR, MEI

A Level

A Level Mathematics

C1 Coordinate Geometry (Straight Lines) (Answers)

Name:

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Total Marks: /47

C1 - Coordinate Geometry - Straight Lines (ANSWERS)
MEI, OCR, AQA, Edexcel

1. Consider the linear function $f(x)$ plotted below.

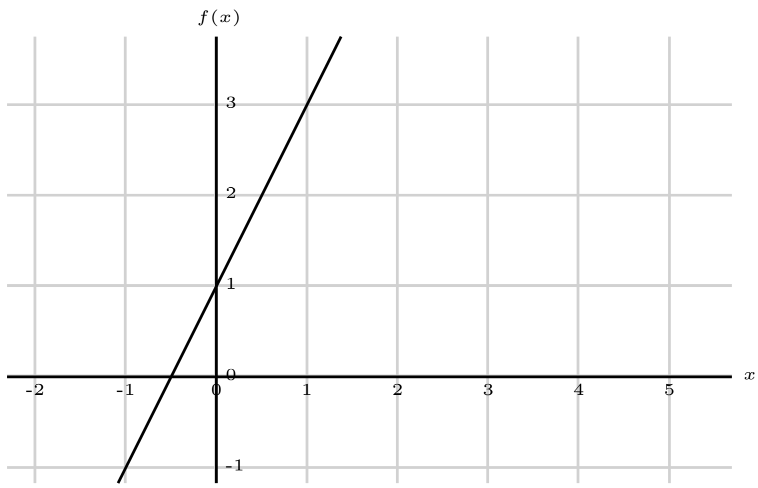


Figure 1: A plot of a linear function $f(x)$.

   (a) $y = 2x + 1$. [2]

2. You are given the line $f(x) = 3x$. Give the gradient of a straight line that is:

   (a) 3. [1]

   (b) $-\frac{1}{3}$. [1]

3. Calculate the distance between the following points:

   (a) 2. [2]

   (b) $\sqrt{10}$. [2]

   (c) $\sqrt{53}$. [2]

4. Calculate the midpoint between the following points:

   (a) $(0, 2)$. [2]

   (b) $(3, \frac{5}{2})$. [2]

   (c) $(5 + \frac{\pi}{2}, 0)$. [2]

5. Sketch the following lines on separate axes, clearly indicating any intersections with the axes:

(a) [2]

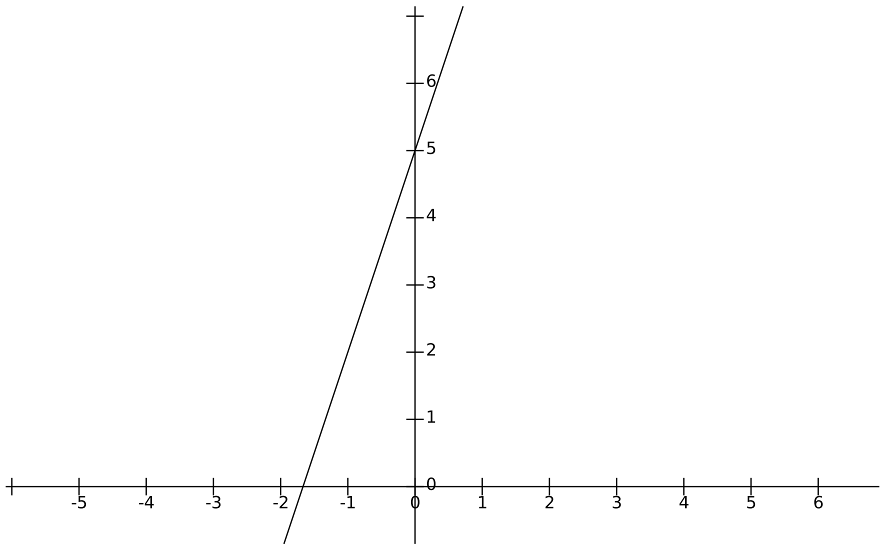


Figure 2: $y = 3x + 5$

(b) [2]

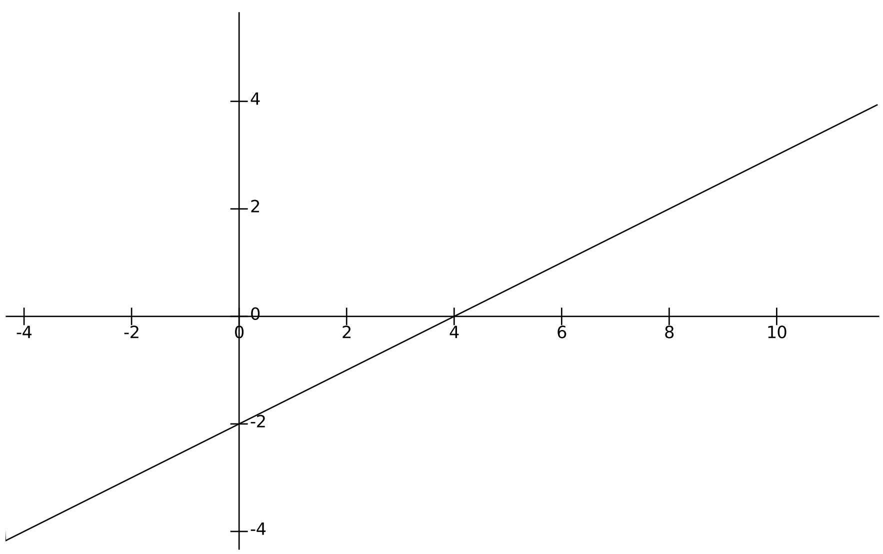


Figure 3: $y = \frac{1}{2}x - 2$

(c) [2]

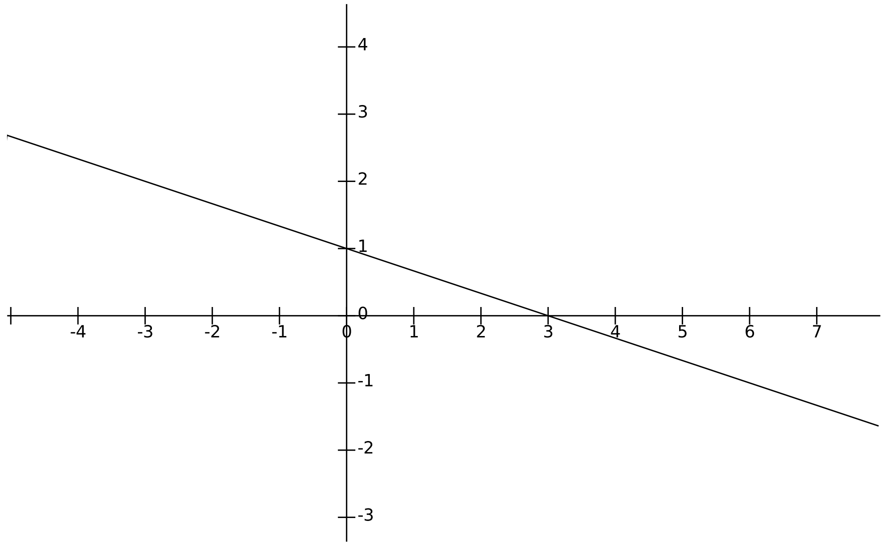


Figure 4: $3y + x = 3$

6. Give the equation of the line that:

   (a) $y = 2x$. [1]

   (b) $y = \frac{1}{5}(x - 3)$. [2]

   (c) $y = \frac{6}{7}(x + 1)$. [2]

   (d) $y = \frac{1}{3}(2 - x)$. [2]

   (e) $y = 100$. [1]

7. Find the points of intersection between the following lines:

   (a) $(0, 2)$. [2]

   (b) $(-4, -11)$. [2]

   (c) $(-36, -14)$. [2]

   (d) $(\frac{1}{2}, -\frac{1}{6})$. [2]

8. Consider the two *perpendicular* linear functions $f(x)$ and $g(x)$ pictured in the figure below. You are given that the *distance* between the points $(-4, 2)$ and $(0, a)$ is 5:

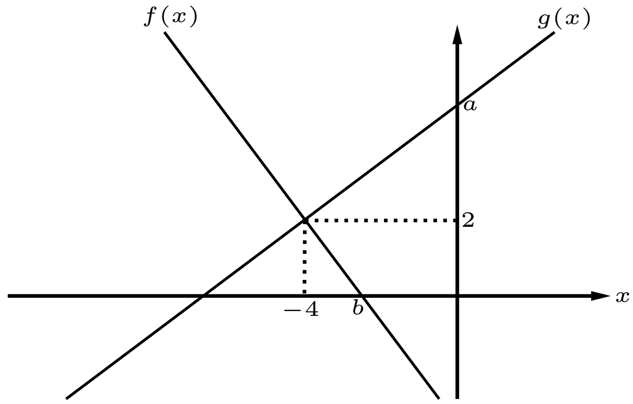
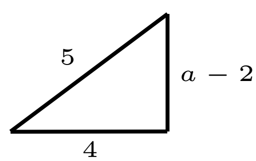


Figure 5: A plot of two linear functions $f(x)$ and $g(x)$.

(a) Consider the triangle below:



Using Pythagoras we form $5^2 = 4^2 + (a-2)^2$.

From which we conclude that $a = 5$.

(a cannot be -1 as we know that a is positive).

[2]

(b) Gradient $= \frac{y_2 - y_1}{x_2 - x_1} = \frac{5-2}{0--4} = \frac{3}{4}$.

Now use $y - y_1 = m(x - x_1)$ on the point $(0, 5)$ *($x_1 = 0, y_1 = 5$)* to get:

$y - 5 = \frac{3}{4}x$.

And so $y = \frac{3}{4}x + 5$ as required. [3]

(c) We know that $f(x)$ is perpendicular to $g(x)$ and so we know that $f(x)$ has gradient $-\frac{4}{3}$.

By using $y - y_1 = m(x - x_1)$ on the point $(-4, 2)$ we get that:

$y = -\frac{1}{3}(4x + 10)$ is the equation of $f(x)$.

Now we simply substitute $y = 0$ into the above and rearrange to get that $x = b = -\frac{5}{2}$ as required.

[4]