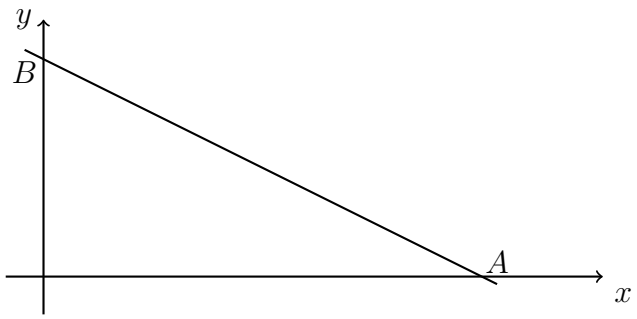
4.11 Exam: Linear equations, function operations, regression

1. [Maximum mark: 9]

The diagram shows the straight line L_1, which intersects the x-axis at $A(k, 0)$ and the y-axis at $B(0, 8)$. The gradient of L_1 is $-\frac{2}{3}$. *Diagram is not to scale*



(a) Find the value of k. [2]

(b) Write down the coordinates of the midpoint M of A and B. [2]

(c) Write down the equation for the line L_1. [2]

(d) The line L_2 is perpendicular to L_1 and passes through M. [3]

Find the equation for the line L_2.

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2. [Maximum mark: 7]

Let $f(x) = 3x + 7$ and $g(x) = 5x$, for $x \in R$.

(a) Write down $g(2)$. [1]

(b) Find $(f \times g)(x)$. [1]

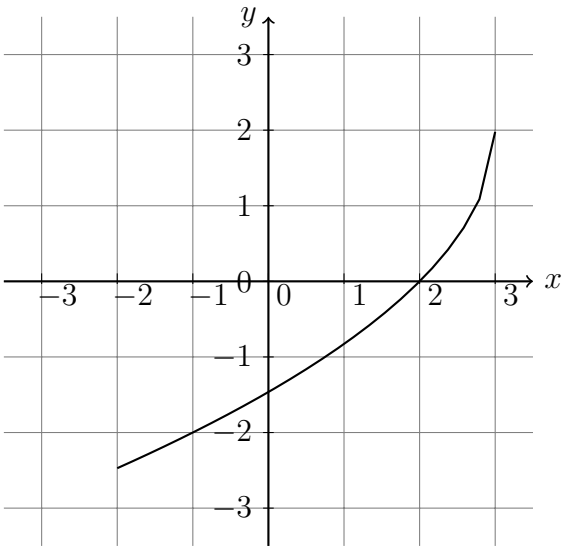
(c) Find $(f \circ g)(x)$. [1]

(d) Write down $g^{-1}(10)$. [2]

(e) Find $f^{-1}(x)$. [2]

3. [Maximum mark: 6]

Early finishers: The diagram below shows the graph of a function f for $-2 \leq x \leq 3$.



(a) Write down the value of $f(2)$. [1]

(b) Write down the value of $f^{-1}(-2)$. [2]

(c) Sketch the graph of f^{-1} on the grid. [3]