



Name: _____

St Leonard's College

10A Linear Relations Mixed Review

Section A

Skills

Complete the questions in section A without using your calculator. Include working throughout.

1. Solve the following equations:

(a) $5x + 3 = -4(1 - x)$

(b) $\frac{x+2}{2} - 6 = \frac{5x}{3}$

2. Solve the following inequalities.

(a) $4 - 2x > 5$

(b) $-4 \leq \frac{3(2-3x)}{5}$

3. Solve the following equations simultaneously.

(a) $y = 2x - 1$
 $y = 5x + 2$

(b) $3x + 2y = -10$
 $x + 4y = 5$

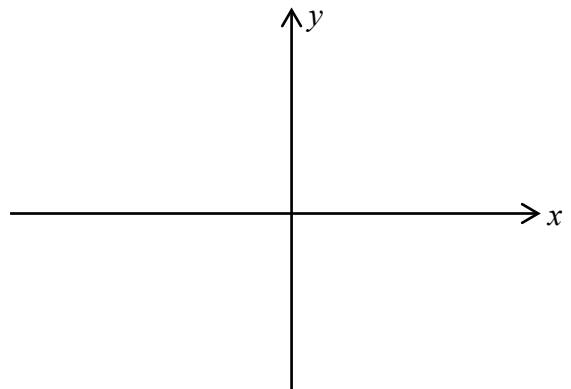
4. Find the equation of the line:

(a) joining the points $(-3, 8)$ and $(5, -2)$

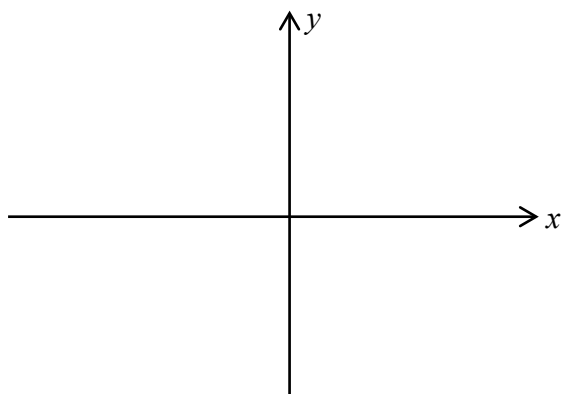
(b) parallel to the y -axis and passing through the point $(3, 2)$.

5. Sketch the graphs of each of the following labelling axis intercepts with coordinates.

(a) $y = 3x - 4$



(b) $2x + 5y = -10$



6. A line has equation $5x - 3y = 15$.

(a) Find the gradient of the line.

(b) Find the equation of the line which is perpendicular to $5x - 3y = 15$ and passes through the point $(0, 4)$.

(c) For the graph of the equation $5x - 3y = 15$, find the exact length of the line segment joining the x and the y intercepts

(d) Find the midpoint of the line segment joining the x and y intercepts of the function $5x - 3y = 15$.

7. (Extension) Find the value of a in the following if:

(a) the line $2x + ay = 4$ is perpendicular to the line $y = 4x - 3$

(b) the line $2x + ay = 4$ and the line $3x + y = 2$ have no point of intersection.

8. (Extension) Consider the simultaneous linear equations $(p - 2)x + y = 6$ and $px + 2y = k$. Find the values of p and k such that the linear equations intersect at the point $(1, 5)$.

Section B

Applications

This section can be completed with a CAS calculator. Where more than one mark is allocated, an appropriate method must be shown.

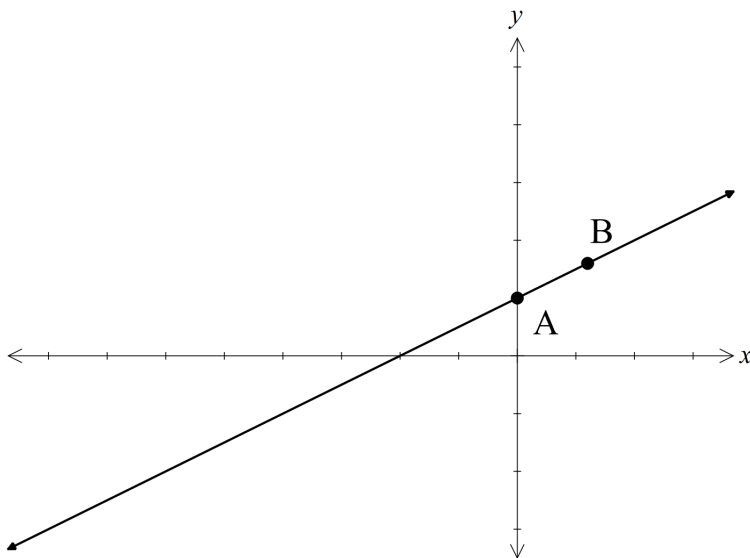
1. Sixty students on 'The Great Victorian Bike Ride' consume either three meals a day or four meals a day. 213 meals are consumed on one particular day.

(a) Define two variables and set up two equations that would help determine how many students ate four meals on this day.

(b) Solve the equations to find how many students ate four meals on this day.

2. Show that the triangle with vertices at $(8, -2)$, $(1, -3)$ and $(9, -9)$ is isosceles.

3. The graph of the line $-x + 2y = 2$ is shown. A line segment AB forms one boundary of a portion of land.



(a) A second boundary exists along the line perpendicular to $-x + 2y = 2$ and goes through the point $(1, 2)$ (and point B). Find the equation of this line.

(b) On the axes above, sketch the graph of the line from part (a). Label all intercepts.

(c) (Extension) The second boundary is a line segment that runs along the line from part (a), starting from point B to the y -axis intercept (point C). The area of land is also bounded by a fence that runs along $x = 0$ (the y axis). Shade the bounded region.

(d) (Extension) If concrete posts are to be placed at the 3 corners (points A, B and C) of the triangular region and a fence run between them, state the exact coordinates of the posts and find the exact length of the fence that would run between posts B and C.

END OF TASK