

Achievement Standard 91269 (Mathematics and Statistics 2.14)

Apply systems of equations in solving problems

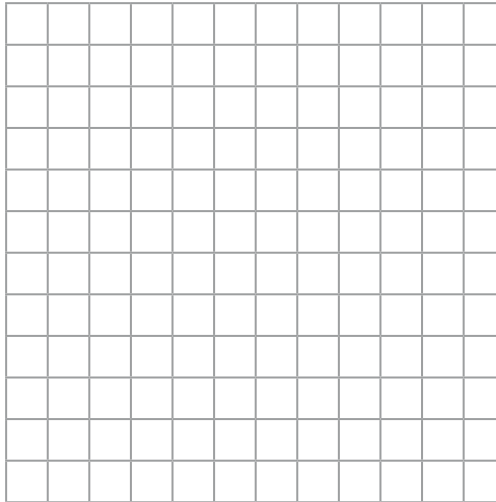
Practice assessment

1. a. On the axes below draw the solution set (i.e. feasible region) of the following systems of inequations:

$$y \geq 4$$

$$2y + 3x \leq 24$$

$$y \leq x + 4$$



- b. Using algebra, with clear steps of working, calculate the coordinates of the three points of intersection of the three straight lines

$$y = 4$$

$$2y + 3x = 24$$

$$y = x + 4$$

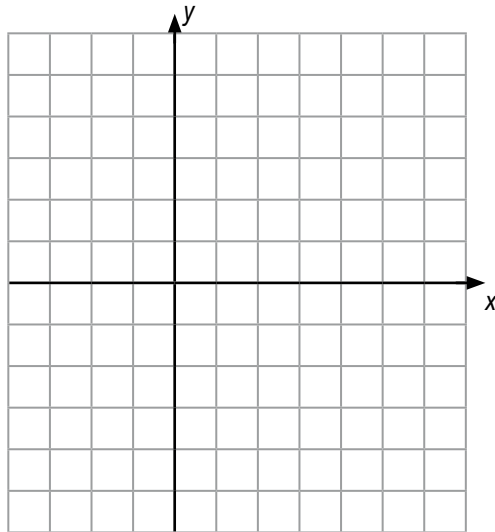
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- c.** Using the coordinates of points in the feasible region only, find the greatest value of the expression $2y + x$.

- 2.** A straight line with equation $y = x - 2$, intersects a curve with equation $y = \frac{6}{x-2}$

- a.** Using algebra, with clear steps of working, calculate the coordinates of the points where the line intersects the curve.

- b.** Draw the graphs of $y = x - 2$ and $y = \frac{6}{x-2}$ on the axes provided, showing their points of intersection marked as A and B.



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- 3.** Mira plays a game which involves tossing a coin to see if it lands heads or tails.
If the coin lands Heads then she scores 3 points.
If the coin lands Tails, then she scores 2 points.
The total number of points in a game must be less than 24.



The coin is biased so that at least twice as many heads turn up as tails.
The game cannot end until at least 4 heads have been tossed.

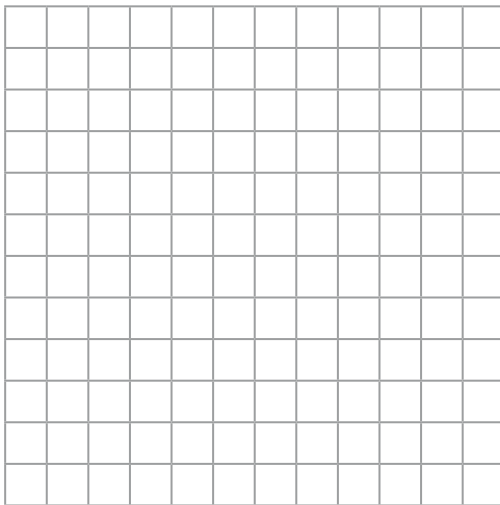
If x heads and y tails turn up in a game, the three inequations are:

$$3x + 2y < 24$$

$$2y \leq x$$

$$x \geq 4$$

- a.** Graph the inequations on the grid below to obtain the feasible solution.



- b.** List the coordinates of all points in the feasible solution

- c.** Which point in the solution represents the highest scoring game possible, and what is the highest score?
