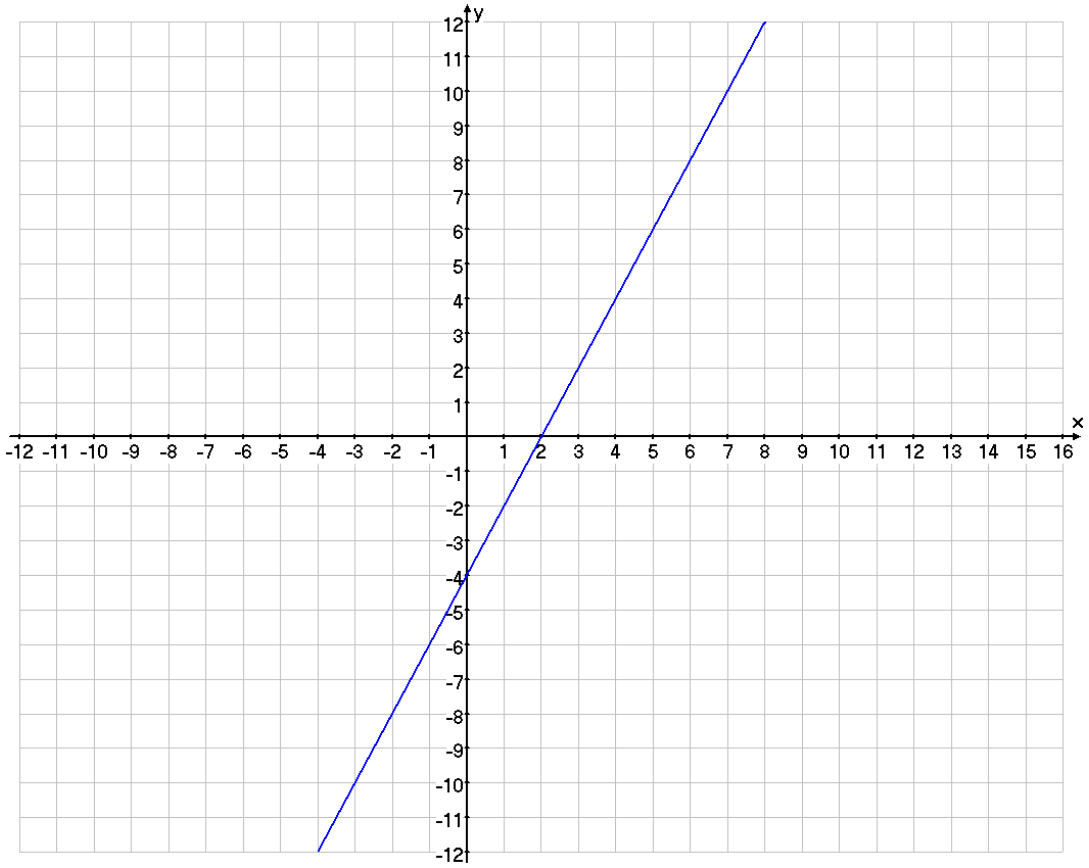
Grade 9 Mathematics Worksheet

Functions and graphs

Questions:

1. a) On the same set of axes, sketch the line which is parallel to the given line $y = 2x - 4$, but at a vertical distance of 3 units away from the given line.



b) Write down the equation(s) of your new line(s).

c) On the same set of axes sketch the graph of $2y = -x - 8$ and explain its relationship to the graph of $y = 2x - 4$.

d) Where do the two graphs intersect?

e) Prove it algebraically.

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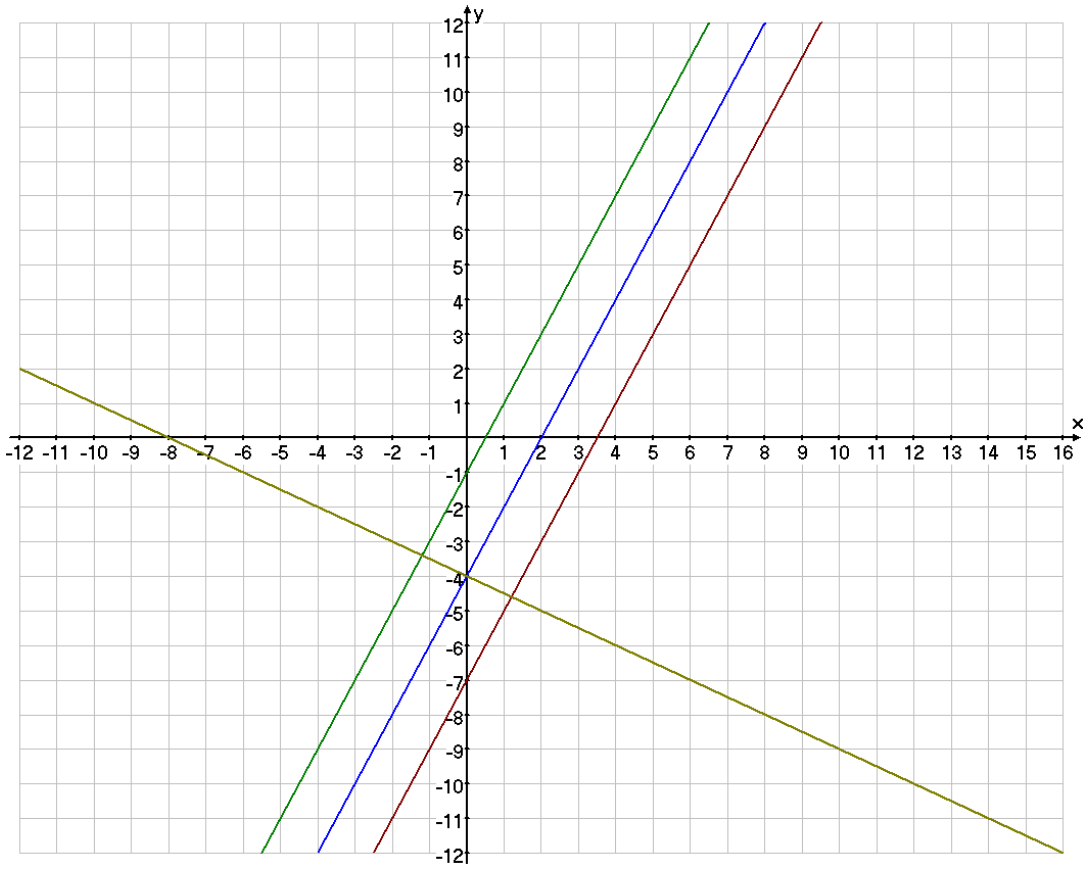
Solution:

1. a)



b) $y = 2x - 4;\ y = 2x - 1\ ;\ y = 2x - 7$

c) See graph in (c) – This line is perpendicular to the original line

d) On the y axis at (0 ; -4)

e) $y = 2x - 4 \text{ and } 2y = -x - 8 \rightarrow y = -\frac{1}{2}x - 4$

$\therefore 2x - 4 = -\frac{1}{2}x - 4 \rightarrow \therefore \frac{5}{2}x = 0 \rightarrow \therefore x = 0$

$\text{and then } y = -\frac{1}{2}(0) - -4. \text{ Thus at } (0; -4)$

The vertical distance implies a translation on the line 3 units up or down. It is not the true distance away from the line. This is a far more complex calculation.