

Name: Key Block: \_\_\_\_\_

**FOM 10 - Chapter 5 Unit Test**

Show all of your work. Circle or clearly indicate your final answer in the space provided.

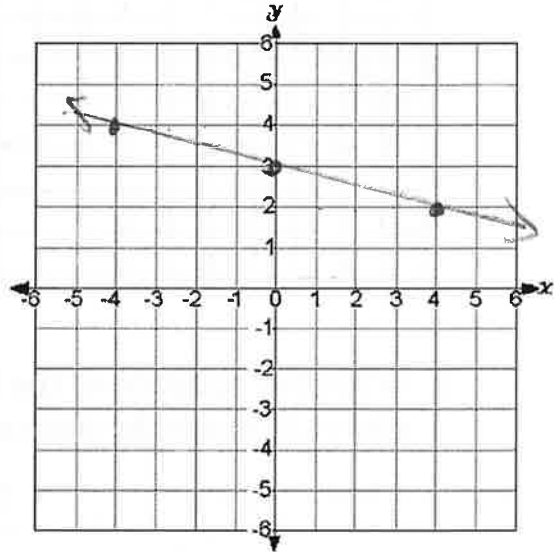
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1. Graph the following linear equation (1 mark):

$$y = \frac{-1}{4}x + 3$$

$$m = -\frac{1}{4}$$

$$b = 3$$



2. Write the equation of the line passing through the point  $(-6, 11)$  with a slope  $m = \frac{-2}{3}$  **in point-slope form** (2 marks).

$$y - y_1 = m(x - x_1)$$

$$y - 11 = -\frac{2}{3}(x + 6)$$

3. Find the slope and y-intercept of the line  $6x - y = -3$  (2 marks).

$$6x - y = -3$$

$$-y = -6x - 3$$

$$y = 6x + 3$$

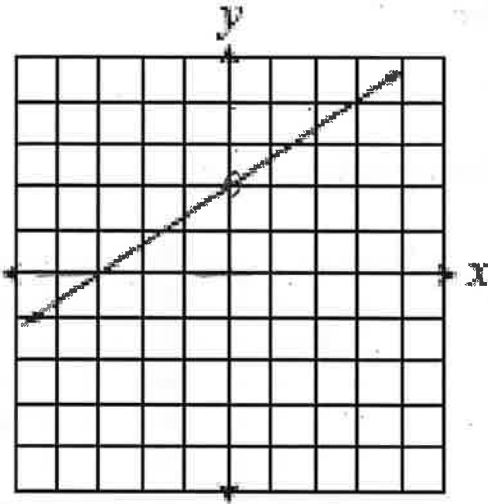
Slope: 6

y-intercept: 3

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4. Write the equation of the line in **slope-intercept form** and **standard form** (2 marks).



$$y = \frac{2}{3}x + 2$$

$$b = 2$$

$$m = \frac{2}{3} \quad \left(-\frac{2}{3}x + y = 2\right) \times -3$$

$$2x - 3y = -6$$

Slope-intercept form:  $y = \frac{2}{3}x + 2$

Standard form:  $2x - 3y = -6$

5. Write the equation of the line, **in slope-intercept form**, that passes through the points A(-5, 9) and B(1, 3) (2 marks).

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - 9}{1 - (-5)} = \frac{-6}{6} = -1 = m$$

$$y = mx + b$$

$$3 = -1(1) + b$$

$$3 = -1 + b$$

$$b = 4$$

$$y = -x + 4$$

pt. B

6. Is the following system of equations parallel, perpendicular, or neither (3 marks):

$$2x - 5y = -3 \quad \text{and} \quad 10x + 4y = 1$$

$$5y = 2x + 3$$

$$4y = -10x + 1$$

$$y = \frac{2}{5}x + \frac{3}{5}$$

$$y = -\frac{10}{4}x + \frac{1}{4}$$

$$y = -\frac{5}{2}x + \frac{1}{4}$$

$$m_1 = \frac{2}{5} \quad m_2 = -\frac{5}{2}$$

since neg. reciprocals lines are  $\perp$

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7. Write the equation of a line, in **slope-intercept form**, that is **perpendicular** to  $4x - 3y = 6$  and passes through  $(8, 2)$  (2 marks).

$$m = \frac{-4}{-3} = \frac{4}{3} \therefore m_2 = \frac{-3}{4}$$

$$y = mx + b$$

$$2 = -\frac{3}{4}(8) + b$$

$$2 = -6 + b$$

$$b = 8$$

$$y = -\frac{3}{4}x + 8$$

8. Write the equation of a line, in **standard form**, that is **parallel** to  $3y + 1 = -4x$  and passes through  $(5, -2)$  (3 marks).

$$3y = -4x - 1$$

$$y = -\frac{4}{3}x - \frac{1}{3}$$

$$m = -\frac{4}{3}$$

$$-2 = -\frac{4}{3}(5) + b$$

$$-2 = -\frac{20}{3} + b$$

$$3x - \frac{2}{1} + \frac{20}{3} = b$$

$$-b + \frac{20}{3} = b$$

$$b = \frac{14}{3}$$

$$y = -\frac{4}{3}x + \frac{14}{3}$$

$$\left(\frac{4}{3}x + y = \frac{14}{3}\right) \times 3$$

$$4x + 3y = 14$$

9. Write the equation of the line **perpendicular** to  $y = 7$  that passes through  $(2, 8)$  (1 mark).

horiz. line,  $m = 0$

$\perp$  means  $m = \text{undefined}$ .

$$x = 2$$

10. Write the equation of the line, in **slope-intercept form**, that is **parallel** to the line on the graph and passes through the point  $(5, -3)$  (3 marks).

$$m_1 = \frac{6}{5} \therefore m_2 = \frac{6}{5}$$

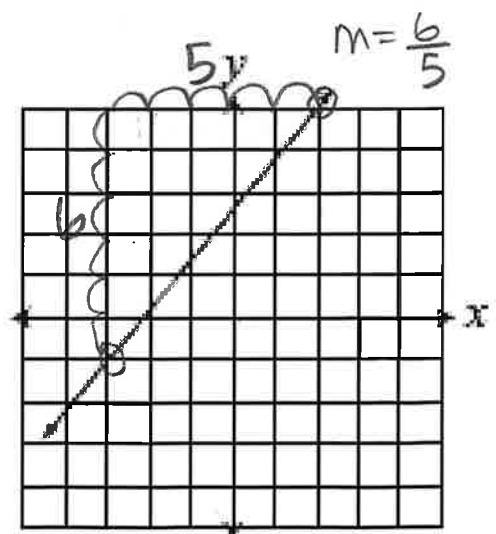
$$y = mx + b$$

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

$$-3 = 6 + b$$

$$-9 = b$$

$$y = \frac{6}{5}x - 9$$



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11. Find the equation of a line, in **slope-intercept form**, that is **parallel** to  $y = \frac{1}{3}x + 7$  with the same y-intercept as  $3x + 2y = 6$

(2 marks).

$$m_1 = \frac{1}{3} \therefore m_2 = \frac{1}{3}$$

$$2y = -3x + 6$$

$$y = -\frac{3}{2}x + 3$$

$$b = 3$$

$$y = \frac{1}{3}x + 3$$

12. For  $f(x) = -2x + 7$ , find (1 mark each):

a.  $f(5)$

$$f(5) = -2(5) + 7$$

$$f(5) = -10 + 7$$

$$f(5) = -3$$

b.  $f(-4)$

$$f(-4) = -2(-4) + 7$$

$$f(-4) = 8 + 7$$

$$f(-4) = 15$$

c.  $f(x) = -13$ , find  $x$

$$-13 = -2x + 7$$

$$-20 = -2x$$

$$x = 10$$

d.  $f(x) = 25$ , find  $x$

$$25 = -2x + 7$$

$$18 = -2x$$

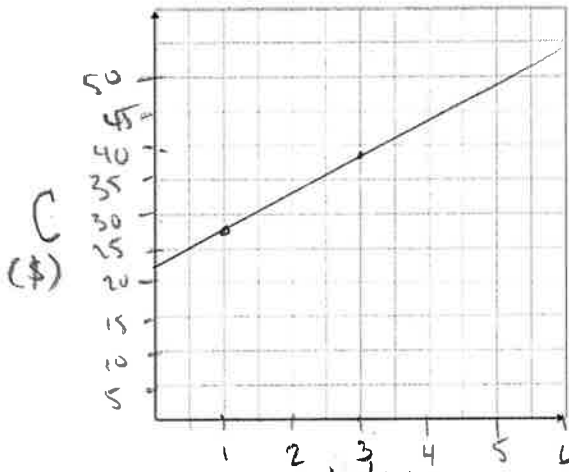
$$x = -9$$

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13. To ship a package from Victoria to Ottawa overnight costs \$27.30 for a 1 pound package, and \$38.80 for a 3 pound package.

a. Sketch the graph the linear relation between the cost, C, and the weight, W (1 mark).



rate =  $m = \frac{\$38.80 - 27.30}{3 - 1 \text{ lb}}$   
 $= \frac{\$11.50}{2 \text{ lb}} = \$5.75/\text{lb}$

b. Find the rate of change (1 mark).

c. Find the fixed cost (1 mark).

$(1, 27.30)$   $y = mx + b$   
 $27.30 = 5.75(1) + b$

$b = \$21.55$

d. Write the cost equation for this linear relation using your answers from b and c (1 mark).

$$C = 5.75W + 21.55$$

e. Find the cost of shipping a 6.5 pound package (1 mark).

$$C = 5.75(6.5) + 21.55$$
$$C = \$58.93$$

f. If a package cost \$45.70, how much does it weigh (1 mark)?

$$45.70 = 5.75W + 21.55$$

$$24.15 = 5.75W$$

$$W = 4.2 \text{ lbs}$$

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**BONUS** (1 mark):Find the equation of the line  $y = mx + b$  given the following:

$$f(-4) = -2$$

$$f(1) = 5$$

$$m = \frac{5 - (-2)}{1 - (-4)} = \frac{7}{5}$$

$$5 = \frac{7}{5}(1) + b$$

$$5x \frac{5 - 7}{5} = b$$

$$\frac{25 - 7}{5} = b$$

$$\frac{18}{5} = b$$

$$y = \frac{7}{5}x + \frac{18}{5}$$