<u>**Show all work.**</u>   <u>**NO WORK SHOWN = NO CREDIT**</u>

Total Possible Points = 125 Points

1) Solve the given formula for N $3N - MP = NS - 4A$ (8 points)

$$3N - NS = MP - 4A$$

$$N(3 - S) = MP - 4A$$

$$N = \frac{MP - 4A}{3 - S}$$

(handwritten note in left margin: $\frac{-6}{4}$ WRONG)

2) For the linear function $3x - 7y = 21$ <u>**SHOW**</u> work to <u>find</u> each of the following

a) Write the above function $3x - 7y = 21$ in slope-intercept form   (3 points)

$$-7y = -3x + 21$$

$$y = \frac{3}{7}x - 3$$

b) The slope is ___$\frac{3}{7}$___   (2 points)

c) The y-intercept is ___$(0, -3)$___   To find x intercept let $y = 0$ (2 points)

$$3x - 7(0) = 21$$

d) The x-intercept is ___$(7, 0)$___ $3x = 21$ (2 points)

$$x = 7$$

3) Complete the following table: (6 points)

SCIENTIFIC NOTATION	CALCULATOR NOTATION	STANDARD FORM
$-2.35 * 10^{-5}$	$-2.35\ E - 5$	-0.0000235
1.258×10^{7}	$1.258\ E\ 7$	12,580,000
2.09×10^{4}	2.09 E 4	20900

**4) Do the following tables represent a Function or Not? EXPLAIN.** (6 points)

FUNCTION OR NOT? EXPLAIN	FUNCTION OR NOT? EXPLAIN

<table>
<tr><td>x</td><td>F(x)</td></tr>
<tr><td>1</td><td>9</td></tr>
<tr><td>2</td><td>8</td></tr>
<tr><td>3</td><td>9</td></tr>
<tr><td>4</td><td>8</td></tr>
<tr><td>5</td><td>7</td></tr>
</table>

Yes a function because for every x there is only one y value.

<table>
<tr><td>x</td><td>G(x)</td></tr>
<tr><td>2</td><td>8</td></tr>
<tr><td>3</td><td>9</td></tr>
<tr><td>4</td><td>11</td></tr>
<tr><td>3</td><td>11</td></tr>
<tr><td>2</td><td>12</td></tr>
</table>

Not a function Because when x = 3 there are two y values.

5) On the grid below, graph the given lines. Label each graph with the appropriate equation. (9 points)

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

(0, 5)
(2, 2)
(4, -1)

b. $y = 2$

c. $x = -4$

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

$y = 2$

$x = -4$

2
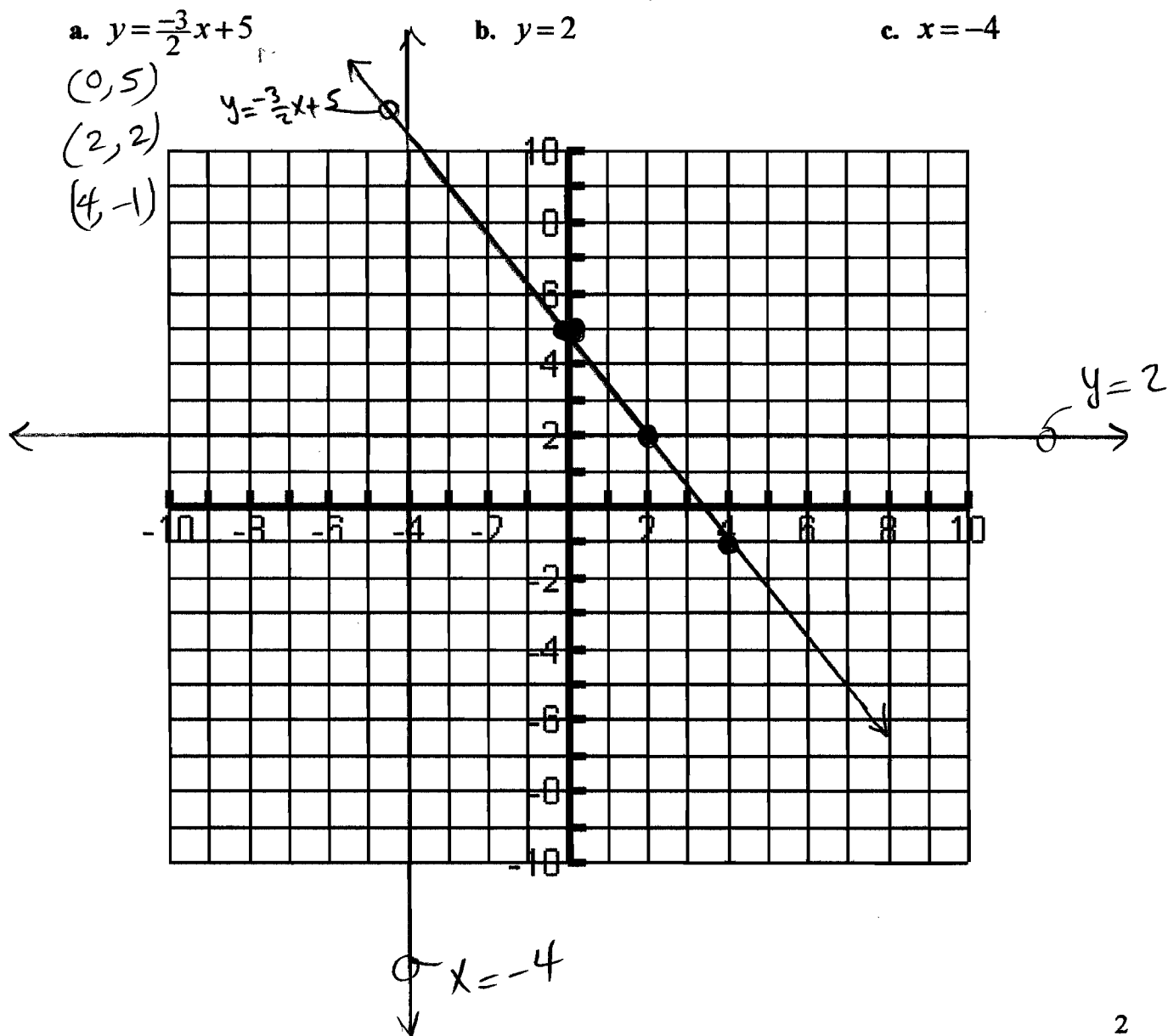
6) What is the slope of the line segment shown in the graph? The answer **MUST contain units**.
(Must Show Procedure)

Value of
Car in
Thousands
of Dollars

Number of Years of Use
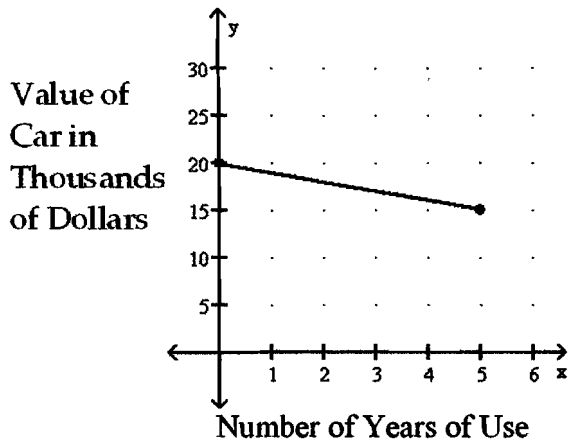
$(0, 20)$

$(5, 15)$

$m = \dfrac{15-20}{5-0} = \dfrac{-5}{5} = -1 \dfrac{\text{thousand dollars}}{\text{year}}$

Interpret the slope as a rate of change **using words within the context of the problem**.

Every year, the car loses $1000 of its value.

7) The following function gives an approximation for the length of the thigh bone of a woman, as a function of ~~his~~ her height, x. $f(x) = 0.432x - 10.44$ (Both variables in inches)

a) Estimate the length of the thigh bone of a 69 inches tall woman. (Round to the nearest tenth of an inch). Answers MUST contain units.
(4 points)

$f(69) = 0.432(69) - 10.44$

$= 19.368 = 19.4 \text{ inches}$

b) An anthropologist discovers a thigh bone of a woman. If the bone is 16 inches long, how tall would you estimate the man to have been? (Round to the nearest tenth of an inch) Answers MUST contain units.
(4 points)

$16 = 0.432 X - 10.44$

$X = 61.2 \text{ inches}$

8) The graph below is a graph of $f(x)$
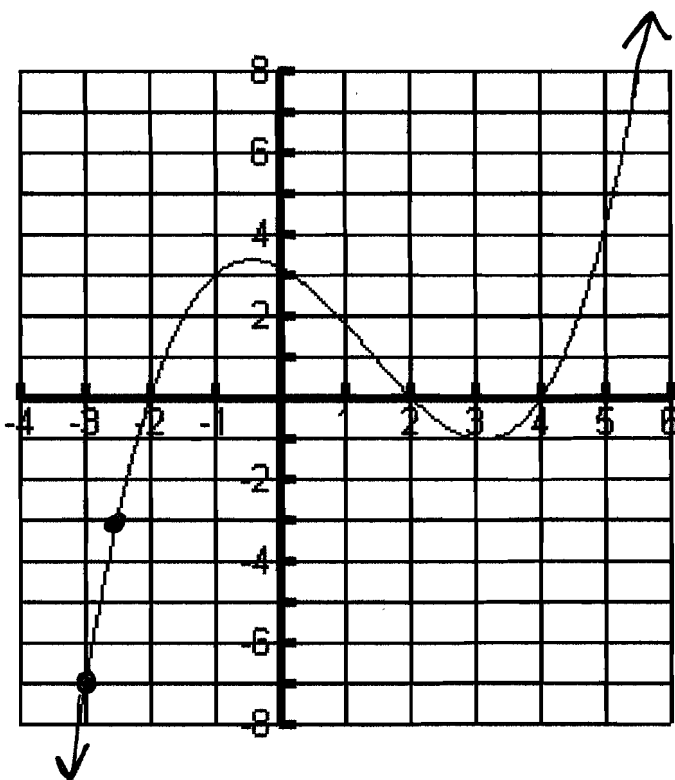
a.   Find the approximate value of $f(-3)$ = __-7__   (2 points)

b.   Approximate the solution to $f(x) \cong -3$. The solution is __$X \cong -2.5$__   (2 points)

c.   State the domain in   Interval notation: $(-\infty, \infty)$ (1 point)

                             Inequality notation: $-\infty < X < \infty$ (1 point)

d.   State the range in   Interval notation: $(-\infty, \infty)$ (1 point)

                             Inequality notation: $-\infty < X < \infty$ (1 point)

e.   What are the x-intercepts? $(-2,0)$; $(2,0)$; $(4,0)$ (2 points)

f.   What is the y-intercept? $(0,3)$ (2 points)

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9) Let $f(x) = -2x^2 + 5x - 8$ and $g(x) = -3x + 9$ (Must Show Procedure) (2 points each)

a. Find $f(-1) = -2(-1)^2 + 5(-1) - 8$ $= -15$	b. Find $g(-5) = -3(-5) + 9 = 24$
c. Find x when $g(x) = 14$ $14 = -3x + 9$ $x = \dfrac{5}{-3} = \dfrac{-5}{3}$	d. Find the x-intercept of $g(x)$ $0 = -3x + 9$ $x = 3$ $(3, 0)$
e. Find $g(a+1)$ $g(a+1) = -3(a+1) + 9$ $= -3a - 3 + 9$ $= -3a + 6$	f. Find $g(a) - 1$ $g(a) - 1 = -3a + 9 - 1$ $= -3a + 8$

10) Jury Awards in Medical Malpractice. The average jury awards in medical malpractice were 1.2 million dollars in 1994, and 3.4 million dollars in 1999.

a) Assuming they follow a linear pattern, find an equation for the average amount of jury award A(t) in millions of dollars as a function of t, number of years since 1994. (7 points)

$(0, 1.2)$ $m = 0.44$
$(5, 3.4)$

$A(t) = 0.44t + 1.2$

b) What is the y-intercept? What is the meaning within the context of the problem? (3 points)

y-intercept is $(0, 1.2)$

In 1994 the medical malpractice Jury Awards were $1.2 million.

c) Based on the model in part (a), find the average jury award in the year 2000. (3 points)

$2000 - 1994 = 6$

$A(6) = 0.44(6) + 1.2 = 3.84$ million

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11) Write an equation of the line that passes through (−2, 3) and is parallel to the line
4X + 7Y = 10 Give final answer in the slope intercept form. **(Must Show Procedure)**

$$7y = -4X + 10$$

$$y = \frac{-4}{7}X + \frac{10}{7}$$

$$y = mX + b$$

$$3 = \frac{-4}{7}(-2) + b$$

$$3 = \frac{8}{7} + b \implies b = 3 - \frac{8}{7} = \frac{21 - 8}{7} = \frac{13}{7}$$

$$\boxed{y = \frac{-4}{7}X + \frac{13}{7}}$$

12) Simplify each of the following. Write answers with positive exponents. Do not use decimals.
(Assume no variables are equal to zero.)   **(Must Show Procedure)**

a) $\left(\dfrac{2y^5 z^3}{y^{10} z^{-4}} \right)^{-2}$

b) $(-5a^{-1}b) \cdot (-2)^{-3}$

$$= \left(2y^{-5} z^7 \right)^{-2}$$

$$= \frac{-5b}{a} \cdot \frac{1}{(-2)^3}$$

$$= 2^{-2} y^{10} z^{-14}$$

$$= \frac{-5b}{-8a} = \boxed{\frac{5b}{8a}}$$

$$= \boxed{\frac{y^{10}}{4 z^{14}}}$$

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13) Solve the following equation $\dfrac{-3x}{4} = \dfrac{5}{3}x - 2$ **(Must Show Procedure)**

Multiply Both Sides by 12

$$12\left(\dfrac{-3x}{4}\right) = 12 \cdot \left(\dfrac{5}{3}x\right) - 12(2)$$

$$\underset{-20x}{-9x} = \underset{-20x}{20x} - 24$$

$$-29x = -24$$

$$\boxed{x = \dfrac{24}{29}}$$

14) If the slope of a line is m = $\dfrac{2}{3}$, then, the slope of a perpendicular line is __$\dfrac{-3}{2}$__

(2 points)

15) The slope of a horizontal line is __$m = 0$__ (2 points)

16) The slope of a vertical line is __$m = undefined$__ (2 points)

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