Instructor: Dr. Francesco Strazzullo   Name_____KEY_____

Instructions. Only calculators are allowed on this examination. Point values of each problem are indicated. Always use the appropriate wording and units of measure in your answers (when applicable). **SHOW YOUR WORK NEATLY, PLEASE** (no work, no credit).

1. Solve the following equations and **check your solution.**

   (a) (10pts) $7x - 1 = 4(1 - 2x)$

   $$7x - 1 = 4 - 8x$$
   $$+8x \quad +1 \qquad +1 \quad +8x$$
   $$\overline{}$$
   $$\frac{15x}{15} = \frac{5}{15}$$
   $$x = \frac{1}{3}$$

   CHECK
   $$7 \cdot \frac{1}{3} - 1 \overset{?}{=} 4\left(1 - 2 \cdot \frac{1}{3}\right)$$
   $$\frac{7}{3} - 1 \overset{?}{=} 4\left(1 - \frac{2}{3}\right)$$
   $$\frac{4}{3} \overset{?}{=} 4\left(\frac{1}{3}\right) \quad \checkmark$$

   (b) (10pts) $\frac{3}{4}x - 2x = 5$

   $$\left(\frac{3}{4} - 2\right)x = 5$$
   $$\frac{-\frac{5}{4}x = 5}{-\frac{5}{4} \qquad -\frac{5}{4}}$$
   $$x = -\left(5 \div \frac{5}{4}\right)$$
   $$x = -\left(5 \cdot \frac{4}{5}\right)$$
   $$x = -4$$

   CHECK
   $$\frac{3}{4} \cdot (-4) - 2(-4) \overset{?}{=} 5$$
   $$-\frac{3}{4} \cdot 4 + 2 \cdot 4 \overset{?}{=} 5$$
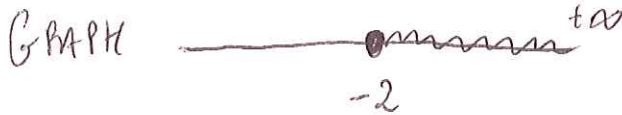 $$-3 + 8 \overset{?}{=} 5 \quad \checkmark$$

2. Find the solution set for the following inequalities, then write the solution in interval notation.

(a) (10pts) $5x \geq 2x - 6$.

$$\frac{-2x \quad -2x}{}$$

$$\frac{3x \geq -6}{3 \qquad 3}$$

$$x \geq -2$$

INTERVAL: $\left[-2, +\infty\right)$

GRAPH

————●∿∿∿∿∿ $+\infty$
        -2

(b) (10pts) $2x - 3x > 4$.

$$\frac{-x}{-1} > \frac{4}{-1}$$

$$x < -4$$

INTERVAL: $\left(-\infty, -4\right)$

$-\infty$ ∿∿∿∿○————
            -4

GRAPH
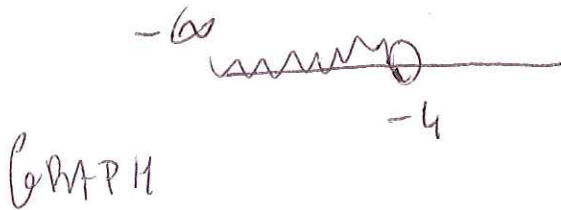
2

Instructor: Dr. Francesco Strazzullo   Name___**K&Y**___

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3. (15pts) Find the slope and the y-intercept for the equation $4x - 3y = 10$.

WHEN $Y = mx + b$, THEN SLOPE $= m$ AND Y-INTER. $= b$

$$4X - 3Y = 10$$
$$-4X \qquad -4X$$
$$\overline{\quad -3Y = -4X + 10 \quad}$$
$$\overline{-3} \quad \overline{-3} \quad \overline{-3}$$

$\to Y = \frac{4}{3}X - \frac{10}{3}$

SLOPE $= \frac{4}{3}$

Y-INTERCEPT $= -\frac{10}{3}$

4. Write the equation of each straight line described.

(a) (10pts) Through $(1,2)$ and $(-1,0)$. POINTS $(1,2) = (x_2, y_2)$, $(-1,0) = (x_1, y_1)$

SLOPE $= \dfrac{y_2 - y_1}{x_2 - x_1} = \dfrac{2 - 0}{1 - (-1)} = \dfrac{2}{1+1} = \dfrac{2}{2} = 1$

$Y = mx + b$ BECOMES $Y = 1X + b$ OR $Y = X + b$ ↩

PLUG ONE POINT, $(-1, 0)$, THAT IS $X = -1$ AND $Y = 0$, IN THE EQUATION)

$0 = -1 + b \to b = 1 \to Y = X + 1$
$+1 \quad +1$

(b) (10pts) Through $(0,3)$ and parallel to the line with equation $y = -2x + 4$.

PARALLEL LINES HAVE SAME SLOPE: HAS SLOPE -2.

THE REQUIRED LINE HAS SLOPE -2 AND Y-INTERCEPT $(0,3)$

THUS:
$$Y = -2x + 3$$

(c) (10*pts*) Horizontal through $(6, -1)$.

HORIZONTAL LINES HAVE EQUATION $y = b$, WHERE b IS THE Y-COORDINATE OF ANY OF ITS POINTS; THUS

$y = -1$

5. (15*pts*) Alberto earns a weekly salary of $250 plus 10% of his sales volume. Write an equation describing Alberto's total weekly earnings for x dollars in sales. Use the following steps.

(a) Which fact gives the slope?

THE SLOPE IS GIVEN BY THE PERCENT OF ALBERTO's COMMISSION,

THAT IS $10\% = \dfrac{10}{100} = .1$

(b) Which fact gives the y-intercept?

THE Y-INTERCEPT IS GIVEN BY THE FIXED EARNINGS, THOSE ALBERTO GETS WHEN HIS SALES ARE NONE $(x = 0)$, THUS $y = 250$ DOLLARS.

(c) Write the equation in the form $y = mx + b$.

$y = .1x + 250$