Solutions

MAT 110 - Test 1 - Open Response Portion - Version 1

Directions. Write answers, and only answers, in answer blanks. Show all work in spaces provided. NO calculator use of any kind is permitted on this portion of the test. Answers without supporting work on numbers 1, 2, and 5 will receive no credit.

1) Solve the absolute value equation.

$|3x + 5| = 4$

Write the solution(s) here: $x = -3, -1/3$

$3x + 5 = 4$ or $3x + 5 = -4$

$-5 \quad -5 \qquad\qquad -5 \quad -5$

$3x = -1 \qquad\qquad 3x = -9$

$\frac{3x}{3} = \frac{-1}{3} \qquad\qquad \frac{3x}{3} = \frac{-9}{3}$

$x = -1/3 \qquad\qquad x = -3$

2) Solve the following linear equation. Write the solution in the blank.

$\frac{5x}{4} + 1 = 11$

Solution: $x = 8$

$\frac{5x}{4} + 1 = 11$

$-1 \quad -1$

$\frac{5x}{4} = 10$

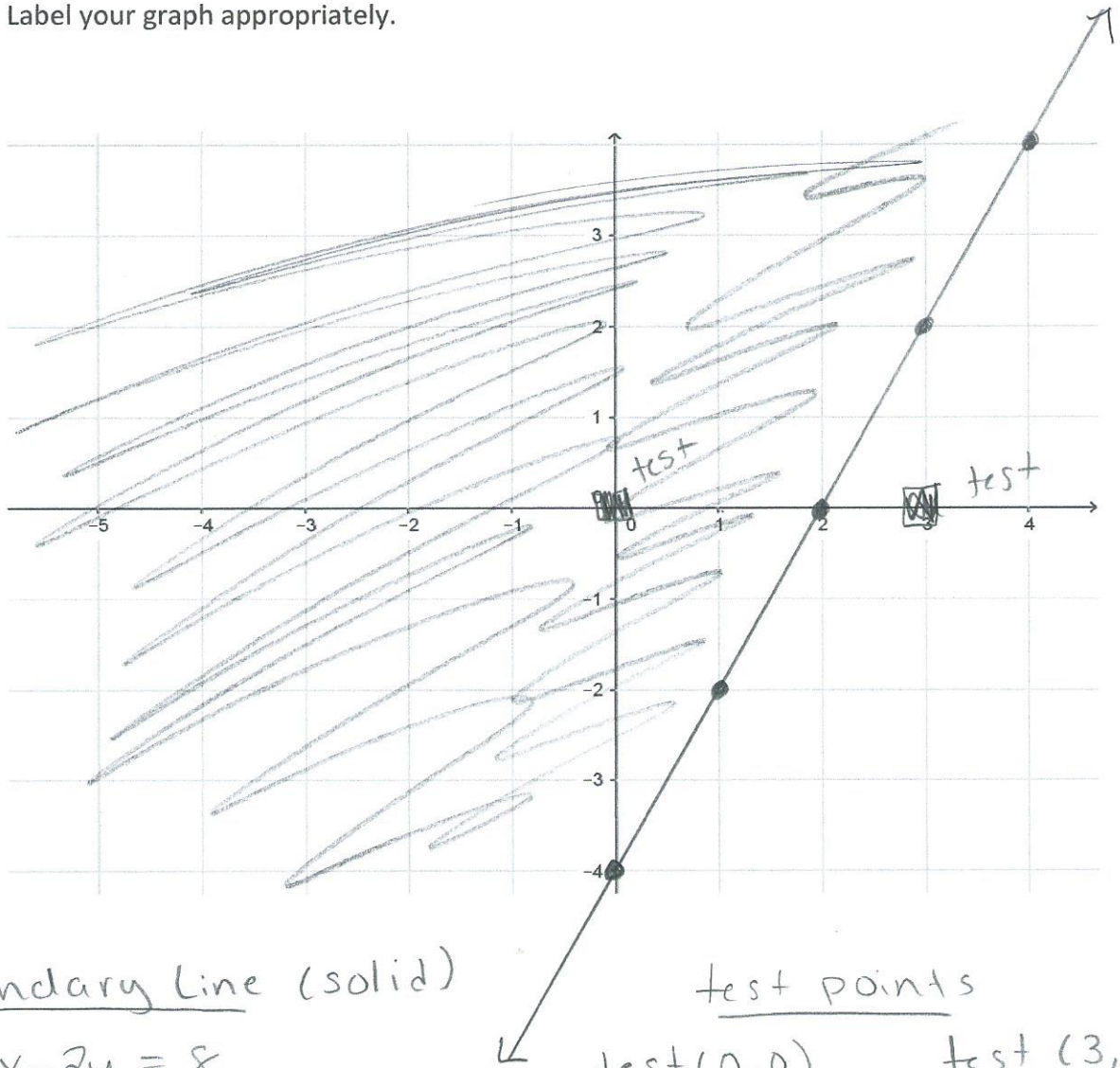
$4\left(\frac{5x}{4}\right) = 10(4)$

$5x = 40$

$\frac{5x}{5} = \frac{40}{5}$

$x = 8$

3) Graph the solution set for the linear inequality on the grid provided below. $4x - 2y \leq 8$
Label your graph appropriately.



boundary Line (solid)

$4x - 2y = 8$

X	y
-4	-12
-3	-10
-2	-8
-1	-4
0	-4
1	-2
2	0
3	2
4	4

test points

test (0,0)

$4(0) - 2(0) \leq 8$

$0 \leq 8$

true, so do shade this side

test (3,0)

$4(3) - 2(0) \leq 8$

$12 \leq 8$

false, so do not shade this side

4) Read the following scenario, and then answer *only* the questions that follow. Do not solve.

Scenario:
Gifted Gardens Incorporated installs mulch flower beds and rock flower beds. Each flower bed must be dug out and filled with material. Each mulch flower bed takes three hours to dig and two hours to fill. Each rock bed takes four hours to dig and five hours to fill. Gifted Gardeners also knows from past business that it can install no more than 10 rock beds per business day. Gifted Gardens is able to employ no more than 240 hours of diggers and no more than 120 hours of fillers per business day. Each mulch flower bed returns a $25.00 profit, and each rock bed returns a $60.00 profit.
How many mulch beds and rock beds should Gifted Gardeners install per business day to maximize profits?

a) Using the variable " m " for the number of mulch flower beds, the variable " r " for the number of rock flower beds, and " P " for profit, write the Objective Function that represents the company's total profits per business day.

Objective Function: $P = 25m + 60r$

b) Write the constraint that describes the number of possible man hours for *digging*.

Answer: $3m + 4r \leq 240$

5) Perform the following using long division. Write the quotient in the answer blank.

$$\frac{8x^3+18x^2-11x-15}{4x+3}$$

Quotient: $2x^2+3x-5$

$$
\begin{array}{r}
2x^2+3x-5 \\
4x+3 \overline{)\,8x^3+18x^2-11x-15} \\
\underline{-8x^3+-6x^2\ \downarrow} \\
12x^2-11x \\
\underline{-12x^2+-9x} \\
-20x-15 \\
\underline{+-20x+-15} \\
0
\end{array}
$$