Name:
Recitation Instructor:
Recitation Day and Time:

Studio College Algebra – Exam 1 – Fall 2021

Directions: You will find 12 problems listed below. Most problems are worth 5 points. No notes/books/friends are allowed. Graphing calculator models above the level of a TI-84 plus are not allowed (in particular, calculators with a built in CAS and/or QWERTY keyboard are not allowed). You have one hour to complete this exam.

1. (a) (5 points) Fill in the blanks below based on this: The function $f(x) = mx + b$, where m and b are real numbers, is a linear function.
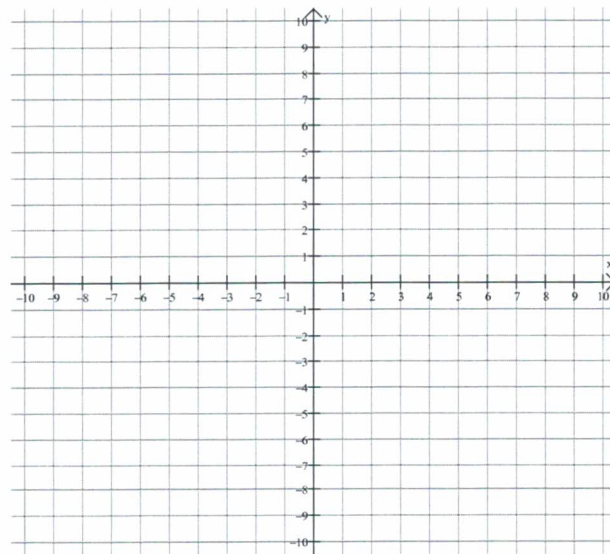
   The "m" represents _____ and the "b" represents the _____

   (b) (5 points) A truck depreciates in value according to a linear model. If the initial value of the truck is \$30,000, and the value thirty years later is \$0, find a linear function that describes the value of the truck after t years.
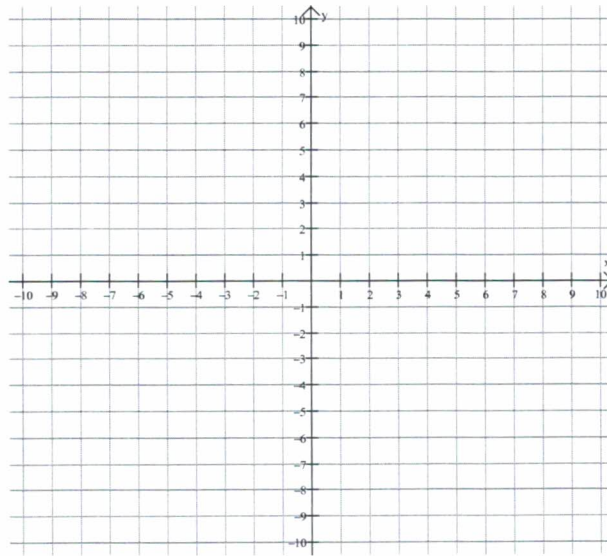
2. Find M if $x = 4$ is a solution for $Mx - 1 = 6x + M$.

3. Solve for x in the equation $-3(4x - 1) + 2 = 7x - 5$.

4. Graph $3x + y = 2$ on the grid below. Include all intercepts.

5. Graph $x - 2y = 4$ on the grid below. Include all intercepts.

6. (a) (5 points) What is the domain of the function $f(x) = \sqrt{5 - x}$?

(b) (5 points) What is the domain of the function $f(x) = \dfrac{3}{4x - 28}$?

7. The temperature T in degrees Celsius inside a concert hall m minutes after a power outage during a winter concert is given by $T(m) = -0.3m + 18$. Find $T(3)$. What is the meaning of your answer?

8. The equation $5F - 9C = 160$ gives the relationship between Fahrenheit and Celsius temperature measurements, where F is the temperature in Fahrenheit and C is the temperature in Celsius. What Celsius measure corresponds to a Fahrenheit measure of 30 degrees? Round your answer to the nearest tenth.

9. Suppose the number of cell phone subscribers (in millions) between the years 1995 and 1999 is described by the model $P(x) = 12.25x + 28$, where x is the number of years since 1995. Find and interpret the meaning of $P(3)$.

10. Suppose the total cost function for the production of ceramic bowls is given by $C(x) = 10x + 2500$, where x is the number of ceramic bowls produced. What is the domain of the function IN CONTEXT of the situation?

11. (15 points) Consider $g(x) = \dfrac{2 - x}{3}$. Answer the following:

(a) Find $g(-3)$.

(b) Find $g(-1)$.

(c) Find $g(0)$.

(d) Find $g(2)$.

(e) Find $g(4)$.

12. In a controlled lab environment, some organisms exhibit constant growth over a specific time period. Suppose a certain organism starts out weighing 12 mg, and grows to 16 mg over a 24 hour time period. Find a linear model that describes the growth of the organism for $0 \leq t \leq 24$ hours. (Hint: Find a linear function $f(t) = mt + b$ that fits with this situation with m and b filled in. You will have to figure out what m and b are for this situation. We want the actual function, not just a graph or picture.)