**Kerry Ojakian's MTH 30 Class**
**Class Assignment #8**

1. **For each equation determine whether it is linear or non-linear?**

   (a) $3x - 2y + x = 7 + y$ (b) $3x^4 + 2y^4 = 8$

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2. **For each equation determine whether it is linear or non-linear?**

   (a) $3 + x = -x + 2(7 - y)$ (b) $3x + x = -2y + 7$

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3. **Find the intercepts of the lines.**

   (a) $2x + 3y = 6$ (b) $-4x + y = 4$

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4. Find the intercepts of the line: $y = -x + \frac{5}{3}$

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5. **Put each line into Slope-Intercept Form.**

   (a) $5x - y = 20$ (b) $2y = 4x - 6$

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6. **Find the slope and y intercept.**

   (a) $y = -\frac{7}{3}x - 9$ (b) $3x + y = 4$

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7. **Find the slope and y intercept.**

   (a) $x - 3y = -3$

   (b) $x + y = 4$

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8. **Find the slope of the line from the given points.**

   (a) $(1, 2)$ and $(3, 6)$

   (b) $(0, 5)$ and $(2, 1)$

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9. Graph each equation.

   (a) $y = 3x + 1$

   (b) $y = 2x - 1$

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10. Graph each equation.

    (a) $y = -1$

    (b) $2x = 4y - 8$

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11. Graph the following function.
$h(x) = \frac{1}{2}x + 1$

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12. Graph the following function.
$f(x) = -2x + 3$

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13. Let $f(x) = 4x - 3$. Find the slope and all intercepts. Then graph $f$.

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14. Find the linear function such that $f(2) = 0.5$ and $f(0) = 0$.

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15. Consider two linear functions $f(x) = -2x + 1$ and $g(x) = 2x + 1$.

    (a) Find the intersection point of $f$ and $g$.

    (b) Give an example of a linear function $h(x)$ that does not intersect $f(x)$. Justify.

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16. Find the equation of the line passing through the point $(1, 3)$ that is parallel to the line with equation $3x + 2y = 5$.

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17. A city's population has been growing linearly. In the year 2005, the population was 50,000, and the population has been growing by 1000 people each year. Write an equation, for the population $t$ years after 2005.

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18. Consider the linear equation $f(x) = (3/2)x - 6$. Find the slope of a line parallel to $f$. Find the slope of a line perpendicular to $f$.

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19. Consider the linear equation $f(x) = -6x$. Find the slope of a line parallel to $f$. Find the slope of a line perpendicular to $f$.

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20. Determine whether the lines are parallel, perpendicular, or neither.

    (a) $y = 3x + 1$ (b) $y = 30x + 1$

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21. Determine whether the lines are parallel, perpendicular, or neither.

(a) $y + 5x = 1$ (b) $y = -5x + 19$

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22. Determine whether the lines are parallel, perpendicular, or neither.

(a) $y + 5x = 1$ (b) $y = -5x + 19$

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23. Write down the linear function whose graph is parallell to the linear function $g(x) = 3x - 1$ and passing through the point $(4, 9)$.

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24. Write down the equation for the line parallel to $h(t) = 3t - 9$ and passing through the point $(0, 0)$.

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25. Write an equation for a line perpendicular to $f(x) = 3x + 4$ and passing through the point $(3, 1)$.

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26. Write an equation for a line perpendicular to $f(x) = -2x + 4$ and passing through the point $(-4, -1)$.

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27. A cell phone company offers two plans.
Plan A: \$20 per month and \$1 for every one hundred texts.
Plan B: \$50 per month with free unlimited texts.
How many texts would you need to send per month for plan B to save you money?

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28. Consider two kinds of gym membership plans.

    - Platinum Plan: \$20 per month + \$3 per fitness class.
    - Gold Plan: \$10 per month + \$6 per fitness class.

    Which plan is better if you attend 2 classes a month? Which plan is better if you attend 5 classes a month?
    How many classes must you attend in a month for the Platinum plan to save you money?

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29. Suppose that the number of people in a town who have a cold grows at a constant rate. In December 100 people have the cold, and a month later, 120 poeple have a cold.

    (a) How many people have a cold in March?

    (b) Write down an equation which models this situation.

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30. Suppose a city's population in 2020 was 4005, has been increasing at a constant rate of 35 people a year.

    (a) Write down a function $P(t)$ which models the population.

    (b) Use your model to predict the population in the year 2030.

    (c) Use your model to predict the population 7.2 years after 2020? (use a calculator if you have one, or leave your answer unevaluated)

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31. Suppose we have a scatter plot of some data comparing hours spent studying with grade on an exam, where hours (t) is the independent variable. Suppose the best-fit line turns out to be this: $G(t) = 20 + 15t$

    (a) According to this best fit line, what will your grade be if you do not study at all?

    (b) How much do you need to study to get 100?