# HW #2

**Kerry Ojakian's MTH 30 Class**
**Due Date:** Tuesday March 24 (beginning of class)

**General Instructions:**

- Homework must be stapled, be relatively neat, and have your name on it. All answers and work should be on this sheet.
- Use tutors, work with other students, but ... don't copy!

**The Assignment**

1. Solve these absolute value equations:

   (a) $|x - 5| = 20$

   (b) $|4x + 7| = 15$

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2. Solve these absolute value inequalities:

   (a) $4|3x - 5| < 40$

   (b) $|4x + 1| + 7 \geq 12$

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3. Show that $f(x) = -3x + 1$ and $g(x) = \dfrac{x - 1}{-3}$ are inverses.

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4. Find the inverse of the function $g(x) = \dfrac{1}{x} + 1$.

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5. Consider the function $f$ given by the following table.

| $x$ | 2 | 4 | 6 | 10 | 15 | 17 |
|---|---|---|---|---|---|---|
| $f(x)$ | 3 | 4 | 13 | 2 | 6 | 14 |

Use the table to evaluate each.

(a) $f(2)$

(b) $f(10)$

(a) $f^{-1}(14)$

(b) $f^{-1}(4)$

(a) $f^{-1}(2)$

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6. Find the slope and y intercept of the lines.

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

(b) $x + y = 4$

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7. 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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8. Graph each equation.

   (a) $y = 3x + 1$

   (b) $y = 2x - 1$

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

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10. 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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11. 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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12. Write an equation for a line perpendicular to $f(x) = 3x + 4$ and passing through the point $(3, 1)$.

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13. Find the point of intersection between the lines, if it exists:
$2x - 3y = 12$ and $5y + x = 30$.

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14. 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?

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15. Consider $y = x^2 + 5x + 6$.

    (a) Find all intercepts.

    (b) Find the point on the graph with maximum $y$ (or explain if none).

    (c) Find the point on the graph with minimum $y$ (or explain if none).

    (d) Graph the equation.

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16. Write the parabola $h(x) = (x-2)^2 + 1$ in in general form.

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17. Write the parabola $g(x) = x^2 - 12x + 32$ in vertex form.

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18. For the quadratic function $f(x) = 2x - x^2 - 2$

    (a) Find its vertex

    (b) Find its $x$- and $y$-intercepts.

    (c) Give the equation of the axes of symmetry.

    (d) Draw the graph.

    (e) Determine its domain and range.

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19. The number of people ($P$) infected $t$ days after a flu outbreak is modeled by $P = -t^2 + 100t + 20$.

    (a) How many days after outbreak is the maximum number sick?

    (b) What is that maximum number of people infected at once?

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