Worksheet # 1: Review

1. Find the equation of the line that passes through $(1, 2)$ and is parallel to the line $4x + 2y = 11$. Put your answer in slope intercept form.
2. Find the slope, x-intercept, and y-intercept of the line $3x - 2y = 4$.
3. Write the equation of the line through $(2, 1)$ and $(-1, 3)$ in point slope form.
4. Write the equation of the line containing $(0, 1)$ and perpendicular to the line through $(0, 1)$ and $(2, 6)$.
5. The quadratic polynomial $f(x) = x^2 + bx + c$ has roots at -3 and 1. What are the values of b and c?
6. Let $f(x) = Ax^2 + Bx + C$. If $f(1) = 3$, $f(-1) = 7$, and $f(0) = 4$ what are the values of A, B and C?
7. Find the intersection of the lines $y = 5x + 10$ and $y = -8x - 3$. Remember that an intersection is a point in the plane, hence an ordered pair.
8. Recall the definition of the absolute value function:

$$|x| = \begin{cases} x & \text{if } x \geq 0 \\ -x & \text{if } x < 0 \end{cases}.$$

   Sketch the graph of this function. Also, sketch the graphs of the functions $|x + 4|$ and $|x| + 4$.
9. A ball is thrown in the air from ground level. The height of the ball in meters at time t seconds is given by the function $h(t) = -4.9t^2 + 30t$. At what time does the ball hit the ground (be sure to use the proper units)?
10. We form a box by removing squares of side length x centimeters from the four corners of a rectangle of width 100 cm and length 150 cm and then folding up the flaps between the squares that were removed. a) Write a function which gives the volume of the box as a function of x. b) Give the domain for this function.
11. True or False:
    (a) For any function f, $f(s + t) = f(s) + f(t)$. False
    (b) If $f(s) = f(t)$, then $s = t$. False (only for 1-1 fncs)
    (c) If $s = t$, then $f(s) = f(t)$. True
    (d) A circle can be the graph of a function. False (fails vertical line test)
    (e) A function is a rule which assigns exactly one output $f(x)$ to every input x. True
    (f) If $f(x)$ is increasing then $f(-52.55) \leq f(1752.0001)$. True!

① First find slope of line: $2y = -4x + 11$

$y = -\frac{4}{2}x + \frac{11}{2}$ $\quad m = -2$

use pt-slope: $y - y_1 = m(x - x_1)$ $\quad \boxed{y - 2 = -2(x - 1)}$

② $3x - 2y = 4$

$-2y = -3x + 4$

$y = \frac{3}{2}x - 2$

$\boxed{m = \frac{3}{2}, \quad y\text{-int} = -2}$

x-int: $0 = \frac{3}{2}x - 2$

$2 = \frac{3}{2}x$

$\frac{4}{3} = x\text{-int}$

③ $(2,1)$ $(-1,3)$

$$m = \frac{3-1}{-1-2} = \frac{2}{-3}$$

$$\boxed{y-1 = -2/3\,(x-2)}$$

④ $(0,1)$ $(2,4)$

$$m = \frac{4-1}{2-0} = \frac{3}{2} \rightarrow m_{\perp} = -\frac{2}{3}$$

$$y-1 = -2/3\,(x-0)$$

$$\boxed{y = -2/3\,x + 1}$$

⑤ $x^2 + bx + c$ $\quad x=-3,\ x=1$ are zeros

↳ $(x+3)(x+1)$ $\quad \Rightarrow (x+3)\ \&\ (x-1)$ factors

$= x^2 + 4x + 3$

$b = 4 \quad c = 3$

(6) $f(x) = Ax^2 + Bx + C$

$f(1) = 3, \quad f(-1) = 7, \quad f(0) = 4$

$f(0) = A \cdot 0 + B \cdot 0 + C = 4 \Rightarrow C = 4$

$f(1) = A + B + 4 = 3$

$A + B = -1$

$f(-1) = A - B + 4 = 7$

$A - B = 3$

$A + B = -1$

$A - B = 3$

$2A = 2$

$A = 1$

$\Rightarrow B = -2$

(7) $y = 5x + 10 \qquad y = -8x - 3$

$5x + 10 = -8x + 3$

$7 = -13x$

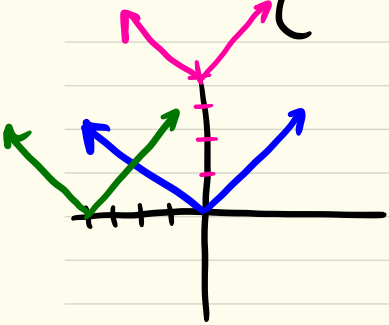
$-7/13 = x$

$y = 5\left(\frac{-7}{13}\right) + 10 = \frac{-35}{13} + 10 = \frac{-35}{13} + \frac{130}{13}$

$y = \frac{95}{13}$

$\left(-7/13, \frac{95}{13}\right)$

⑧ $|x| = \begin{cases} -x & x \le 0 \\ x & x > 0 \end{cases}$



$|x|+4$ ↑ 4

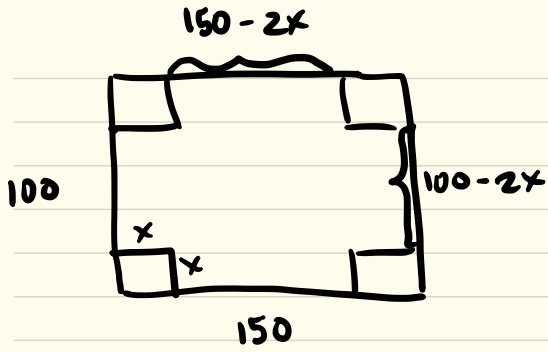
$|x+4|$ ← 4

⑨ $y = -4.9t^2 + 30t$

$y(t) = 0 = -4.9t^2 + 30t$

$t(-4.9t + 30)$

$t = \frac{30}{4.9}$



$V(x) = (100 - 2x)(150 - 2x) \cdot x$

Domain $(0, 100)$

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