

ANSWER KEY

Math 105

Quiz #1

September 9, 2013

1. [5 Points] Solve the equation $|2x - 3| = 7$ for x .

We have $2x - 3 = \pm 7$. That is $2x - 3 = 7$ or $2x - 3 = -7$.

First $2x - 3 = 7$ implies $2x = 10$ which implies $x = 5$.

Second $2x - 3 = -7$ implies $2x = -4$ which implies $x = -2$.

Finally the solution is $\boxed{x = -2 \text{ or } x = 5}$. (*If you are being extra careful, you should check your answers by plugging them back into the original equation and see if they satisfy the equation.*)

2. [5 Points] Consider the line $x + 3y = 7$.

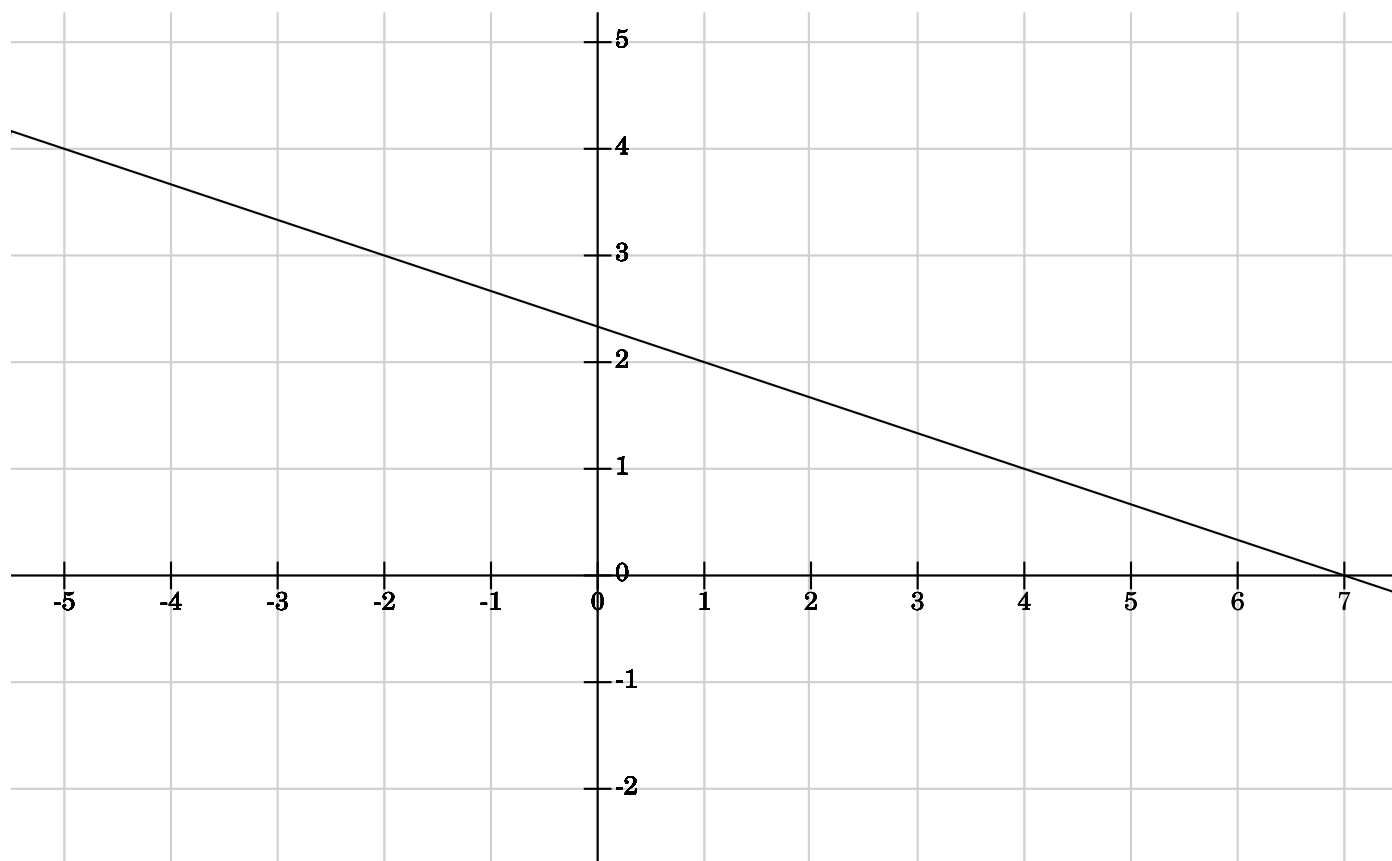
(a) What is the slope of this line?

First we simplify the equation into *slope-intercept form*.

$x + 3y = 7 \implies 3y = -x + 7 \implies y = -\frac{1}{3}x + \frac{7}{3}$. Now we have the slope-intercept form $y = mx + b$.

We pick off the slope $\boxed{m = -\frac{1}{3}}$.

(b) Sketch the line $x + 3y = 7$. From Part(a) above we have the slope-intercept form $y = mx + b$ as $y = -\frac{1}{3}x + \frac{7}{3}$. We already knew slope was $m = -\frac{1}{3}$, but we can also pick off the y -intercept as $y = \frac{7}{3}$. The sketch is below.

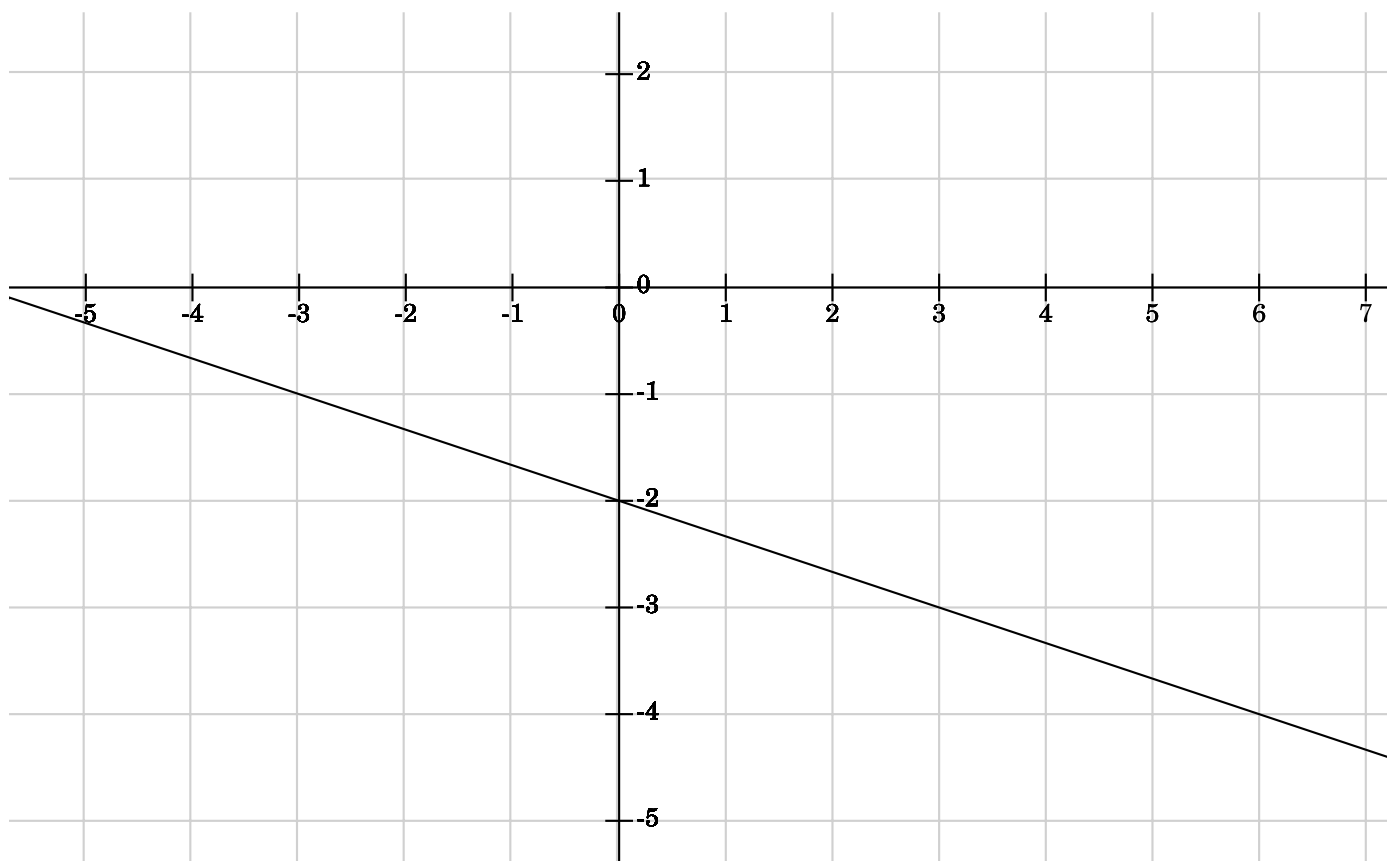


(c) Find the equation of the new line L that is **parallel** to the above line $x + 3y = 7$ and passes through the point $(6, -4)$. Please simplify. **THEN** sketch this new line L.

Lines are parallel if they share the same slope. So our new line L needs to also have slope equaling $-\frac{1}{3}$, but pass through the point $(6, -4)$. Here we use *point-slope form* $y - y_1 = m(x - x_1)$.

So we need $y - (-4) = -\frac{1}{3}(x - 6)$ which simplifies to $y + 4 = -\frac{1}{3}x + 2$ or finally in slope-intercept form $y = -\frac{1}{3}x - 2$.

The sketch is below.



3. [5 Points] Consider the function $f(x) = x^2 + 4x + 3$.

(a) Compute $f(0)$. We have $f(0) = 0^2 + 4(0) + 3 = \boxed{3}$.

(Note this value $y = 3$ is the y -intercept.)

(b) Compute $f(-7)$. We have $f(-7) = (-7)^2 + 4(-7) + 3 = 49 - 28 + 3 = 52 - 28 = \boxed{24}$.

(c) Compute $f(a)$. We have $f(a) = \boxed{a^2 + 4a + 3}$.

(d) For what values x is $f(x) = 0$?

We can solve $f(x) = x^2 + 4x + 3 = 0$ by factoring

$$f(x) = (x + 3)(x + 1) = 0 \implies (x + 3) = 0 \text{ or } (x + 1) = 0 \implies \boxed{x = -3 \text{ or } x = -1}$$

(Note these values are the x -intercept.)

(e) Compute $f(x + h)$. Simplify.

4. [5 Points] Consider the function $f(x) = \frac{1}{x - 7}$. What is the **Domain** of f ?

Domain = $\boxed{\{x | x \neq 7\}}$ or $\boxed{(-\infty, 7) \cup (7, \infty)}$.