

# Quiz 3

Math 3C: Precalculus

October 17, 2019

When you finish, please remain seated until class is dismissed

Name: Solutions

PID: \_\_\_\_\_

**Problem 1** (5 points). Let  $f(x) = \sqrt{x+3} + 7$ .

(a) Determine a formula for  $f^{-1}(x)$ .

$$\text{Let } y = f(x) = \sqrt{x+3} + 7$$

$$\text{Then } y = \sqrt{x+3} + 7$$

Solve for  $x$ :

$$y - 7 = \sqrt{x+3}$$

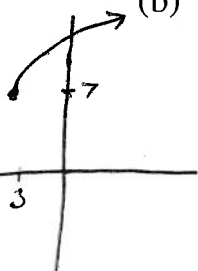
$$\Rightarrow (y-7)^2 = x+3$$

$$\Rightarrow (y-7)^2 - 3 = x$$

$$\text{So } \underline{f^{-1}(y) = (y-7)^2 - 3}$$

(b) What is the range of  $f(x)$ ?

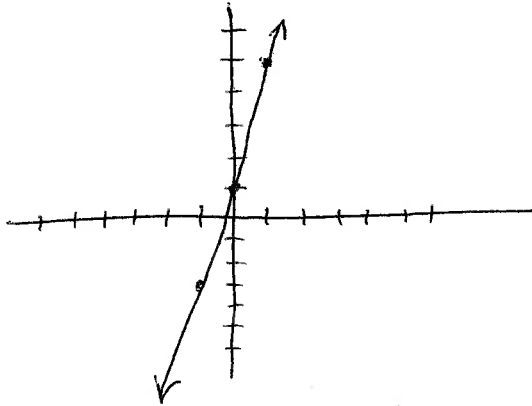
The range of  $\sqrt{x}$  is all  $y \geq 0$ , and  $f(x) = \sqrt{x+3}$  is like  $\sqrt{x}$  but shifted up by 7 and left by 3, so the range must be all  $y \geq 7$ .



(c) What is the domain of  $f^{-1}(x)$ ?

The domain of  $f^{-1}(x)$  is the range of  $f(x)$ , so it is also all  $y \geq 7$ .

**Problem 2** (5 points). (a) Sketch the line  $p(d) = 4d + 1$ .



(b) Let  $q(d) = -2d - 11$ . Where do the lines  $p(d)$  and  $q(d)$  intersect? Write your answer as a coordinate pair.

$$\text{Set } p(d) = q(d)$$

$$\text{That means } 4d + 1 = -2d - 11$$

$$\text{Solve for } d: \quad 4d = -2d - 12$$

$$6d = -12$$

$$d = -2$$

$$\begin{aligned} \text{Plug in } d: \quad p(-2) &= 4 \cdot (-2) + 1 \\ &= -8 + 1 \\ &= -7 \end{aligned}$$

Intersects at  $\boxed{(-2, -7)}$