

Name: \_\_\_\_\_

1. How are the graphs of the functions obtained from the graph of  $f$ ?

- (c)  $y = f(x) + 1$ , **Answer:** Shift up by 1.  
(d)  $y = f(x + 1)$ . **Answer:** Shift to the left by 1.

2. For which  $x$  is the function  $f(x) = -2x(4-x)^{-1/2}$  not defined?

**Answer:** The answer depends on whether we allow our functions to take complex values. If not, the answer is  $x \in [4, \infty)$ . If so, the answer  $x = 4$ . I accepted both answers. However, in the future, we will usually restrict attention to real-values in this class.

3. If  $f(x) = x^2$ , what is the function  $f \circ f$ ? **Answer:**  $f \circ f(x) = x^4$

4. If  $f(x) = x^2 - 1$ , what is the function  $f \circ f$ ? **Answer:**  $f \circ f(x) = x^4 - 2x$

5. For  $f(x) = \sin x$ , find all  $y$  such that there exists some  $x$  with  $y = f(x)$ . (That is, find the range of  $f$ ). Express the answer as an interval. **Answer:**  $[-1,1]$

6. Express 60 degrees in radians. **Answer:**  $\pi/3$

7. Express  $\pi/3$  radians in degrees. **Answer:** 60

8. What is  $\cos \pi/3$ ? **Answer:** 1/2. Use “SOH CAH TOA” and consider the 30-60-90 triangle with hypotenuse of length 1.

9. What is  $\sin \pi/3$ ? **Answer:**  $\frac{\sqrt{3}}{2}$ .