# Instructions

- Complete the problems as if this were an actual test.
    - 50-60 minutes of <u>uninterrupted</u> time. (this means no phones, Netflix, snapchat, etc....I promise you will survive 😊)
    - No help from notes, friends, google, etc.

- After you have completed the problems, grade your test using the key provided.

- Try extra problems similar to the ones you missed until you feel like you understand those concepts.

<mark>Multiple Choice. Choose the best answer. There is only one correct answer for each problem.</mark>

1. Describe the transformation from $f(x) = \sqrt[3]{x}$ to $g(x) = \sqrt[3]{3x}$
   a. a vertical stretch
   b. a vertical compression/shrink
   c. a horizontal stretch
   d. a horizontal compression/shrink

2. Which is the result of simplifying $\sqrt{18x^2 y^5}$ ? Assume all variables to be positive.
   a. $2xy^2 \sqrt{3y}$
   b. $2xy\sqrt{3y^3}$
   c. $3xy^2 \sqrt{2y}$
   d. $3x^2 y^5 \sqrt{2}$

3. The time it takes a pendulum to complete one full swing is given by the radical function $T = 2\pi \sqrt{\dfrac{L}{9.8}}$, where

   $T$ is the time in seconds and $L$ is the length of the pendulum in meters. To the nearest tenth of a second, how long does it take for the pendulum to complete one full swing it its length is 1.2 meters?
   a. 0.4 seconds
   b. 0.7 seconds
   c. 1.2 seconds
   d. 2.2 seconds

4. Which of the following is $xy^{3/2}$ written in radical terms?
   a. $x\sqrt{y^3}$
   b. $\sqrt{xy^3}$
   c. $x\sqrt[3]{y^2}$
   d. $\sqrt[3]{xy^2}$

5. If $f(x) = \sqrt{x+3}$ and $g(x) = x^2$, find $(f \circ g)(3)$
   a. 6
   b. 9
   c. $2\sqrt{3}$
   d. $4\sqrt{3}$

6. If $f(x)$ and $g(x)$ are inverses then $f(g(x)) =$
   a. $-x$
   b. $x$
   c. 0
   d. 1

**Free Response. <u>Show all work</u>! You will not receive any credit if there is no work to support your answers.**

*Given* $f(x) = x^2 + x$ *and* $g(x) = 2x - 1$, *perform the indicated operation and simplify when possible. State the Domain on 7 and 8.* (+2 for each)

7. $(f - g)(x)$    $D:$ _____

8. $(g \circ f)(x)$    $D:$ _____

9. $(f \cdot g)(2)$

10. $(g \circ f)(-2)$

11. Given $f(x) = (x - 2)^2$.
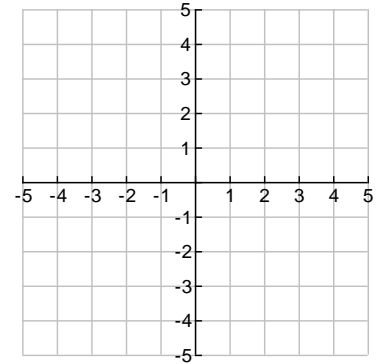
    a.   Graph $f(x)$. (+2)

    b.   Restrict the domain of $f(x)$ so it is a one-to-one function. (+1)

      Domain: _____

    c.   Find $f^{-1}(x)$. (+2)

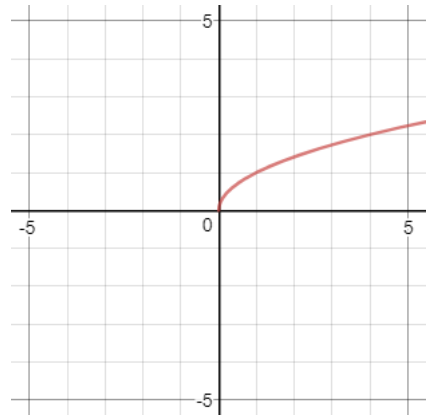      Then graph $f^{-1}(x)$ on the same coordinate system as $f(x)$.

$$f^{-1}(x) = \underline{\hspace{3cm}}$$

*The graph of the square root function, $f(x) = \sqrt{x}$, is shown below..*

*Sketch the graph obtained by the following changes, and then write an equation for the new function $g(x)$.* (+3; 2 pts equation; 1 pt graph)

12.   Vertical stretch by a factor of 2; shift left 3

      $g(x) = \underline{\hspace{3cm}}$

13. Find the inverse function of $f(x) = \dfrac{5x-2}{2}$.  (+3)


$f^{-1}(x) = $ _____


***Simplify.  Rationalize any denominators.  Assume all variables to be positive.*** (+3 each)

14. $\left(x^3 y^5\right)^{-3}$

15. $5\sqrt[3]{16} - \sqrt[3]{54}$


16. $\dfrac{4}{\sqrt{2}}$

17. $\sqrt{3} \cdot \sqrt{15}$


***Solve.  Check your answers.*** (+3 each)

18. $\sqrt[3]{x-7} + 8 = 10$

19. $\sqrt{x+5} = x+3$