Practice Test Packet Chapter 4 Pre-Calculus Name_____

#1-4 True or False.

1. A function $y = f(x)$ may have more than one y-value paired with each x-value. ___False_____

2. The graphs of a function and its inverse are symmetric with respect to the line y = x. ____True_____

3. In a rational function, a common factor in the numerator and denominator create a vertical asymptote. __False_____

4. Function composition is associative. _____False_____

#5-7 Give the domain, range and zeros of the following functions:

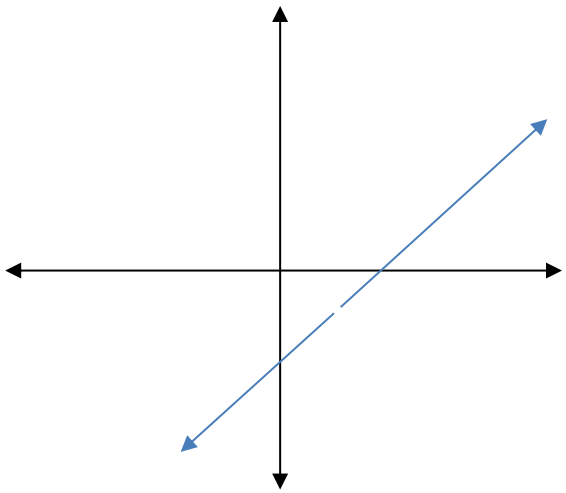
5. $f(x) = (x-1)^2 + 2$ Domain:_____(-∞,∞)_____Range:_____[2,∞)_____

6. $f(t) = \sqrt{16 - t^2}$ Domain:_____[-4,4]_____Range:_____ [0,4]_____

7. $f(x) = \frac{\sqrt{x+1}}{x^2}$ Domain:_____ [-1,0)∪(0,∞)_____Range:_____ [0,∞)_____

#8-9 **Let** $f(x) = \frac{x^2-5x+6}{x-2}$

8. Sketch the graph of $f(x)$.



9. Show all work for all critical points: Domain, range, intercepts, asymptotes, point discontinuity.

$f(x) = \frac{x^2-5x+6}{x-2} = \frac{(x-3)\cancel{(x-2)}}{\cancel{(x-2)}} = x - 3$

P.D.@ x = 2 Domain: (-∞,2)∪(2,∞)
Range: (-∞,-1)∪(-1,∞)

x-int (3,0) y-int (0,-3)

No V.A. No H.A.

#10-13 If $f(x) = 5x$ and $g(x) = \frac{2-x}{x^2+3}$, evaluate the following:

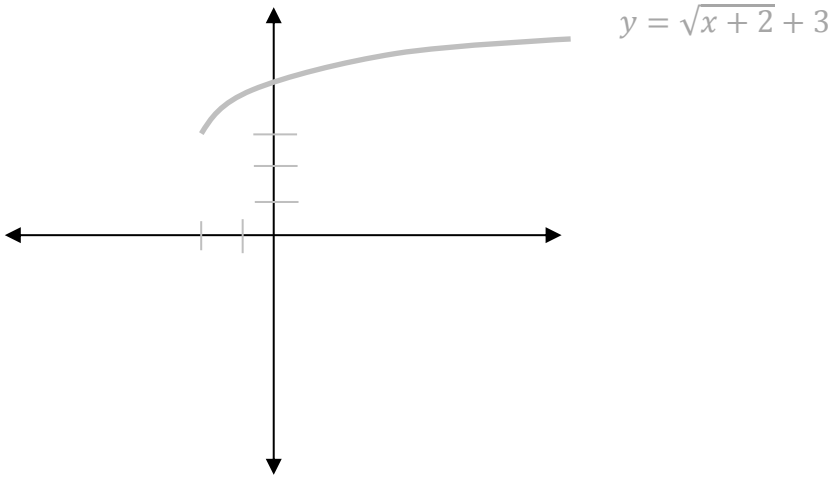
10. $f(g(3))$ _____$\frac{-5}{12}$_____

11. $f(3)g(3)$ _____$\frac{-5}{4}$_____

12. $(f \circ g)(x)$ _____$\frac{10-5x}{x^2+3}$_____

13. $g(f(x))$ _____$\frac{2-5x}{25x^2+3}$_____

14. Sketch the graph of $y - 3 = \sqrt{x+2}$



#15-17 **Let** $h(x) = (x+2)^3$

15. Find a rule for $h^{-1}(x)$. _____$= \sqrt[3]{x} - 2$_____

$$y = (x+2)^3$$
$$x = (y+2)^3$$
$$\sqrt[3]{x} = \sqrt[3]{(y+2)^3}$$
$$\sqrt[3]{x} = y + 2$$
$$\sqrt[3]{x} - 2 = y$$

16. Use compositions to prove that $h(x)$ *and* $h^{-1}(x)$ are inverses.

$$h\left(h^{-1}(x)\right) = \left(\left(\sqrt[3]{x} - 2\right) + 2\right)^3$$
$$= \left(\sqrt[3]{x}\right)^3$$
$$= x$$

$$h^{-1}\left(h(x)\right) = \sqrt[3]{(x+2)^3} - 2$$
$$= x + 2 - 2$$
$$= x$$

17. Sketch the graphs of $y = h(x)$ and $y = h^{-1}(x)$.
Show $h^{-1}(x)$ as a dotted line.