Pre-Calculus **HW#1.9-2** **Name:** Key

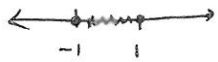
Find the domain for each problem:

1. $f(x)=\sqrt[4]{1-x^2}$ $\boxed{D: [-1, 1]}$

$1-x^2 \geq 0$

$1 = x^2$

$\pm 1 = x$



2. $f(x)=\dfrac{\sqrt{x}}{x^2-4}$ $\sqrt{x} \rightarrow x \geq 0$; $x^2-4 \rightarrow x \neq -2, 2$

$(x-2)(x+2)$

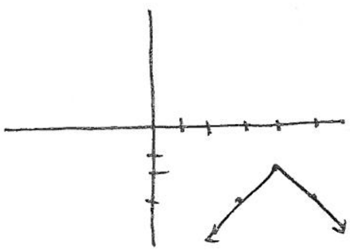
$\boxed{\text{Both} \rightarrow D: [0, 2) \cup (2, \infty)}$

3. $f(x)=\sqrt{x^2-7x+12}$ $\boxed{D: (-\infty, 3] \cup [4, \infty)}$

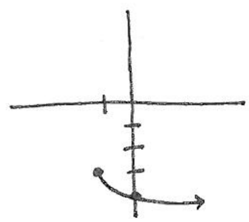
$(x-3)(x-4)$

Graph each equation:

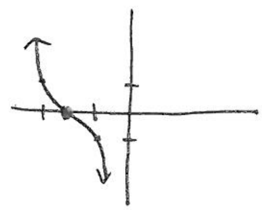
4. $g(x)=-|x-4|-2$



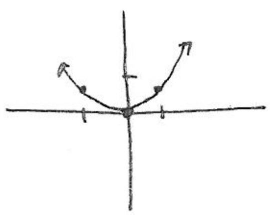
5. $j(x)=-\sqrt{x+1}-3$



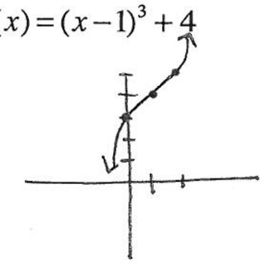
6. $h(x)=-(x+2)^3$



7. $f(x)=\dfrac{1}{2}x^2$

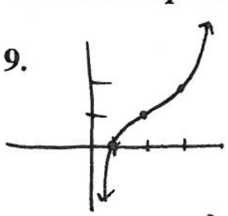


8. $h(x)=(x-1)^3+4$



Write the equation of each graph:

9.

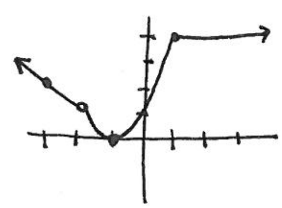


$f(x) = (x-2)^3 + 1$

10.

$f(x) = -\sqrt{x-3} - 1$

11.



$f(x) = \begin{cases} -x-1, & x < -2 \\ (x+1)^2, & -2 < x \leq 1 \\ 4, & x > 1 \end{cases}$

Find f(g(x)) and then give the domain.

12. $f(x)=\dfrac{x}{x+5}$ and $g(x)=\dfrac{6}{x}$

$f(g(x)) = \dfrac{\frac{6}{x}}{\frac{6}{x}+5} \cdot \dfrac{x}{x} = \boxed{\dfrac{6}{6+5x}}$

D: $x \neq 0, -\frac{6}{5}, -5$

13. $f(x)=x^2+1$ and $g(x)=\sqrt{2-x}$

$f(g(x)) = (\sqrt{2-x})^2 + 1$

$= 2-x+1$

$= \boxed{3-x}$

D: $(-\infty, 2]$

14. Show that $f(x)=\dfrac{3x-2}{5x-3}$ is its own inverse.

$x = \dfrac{3y-2}{5y-3}$

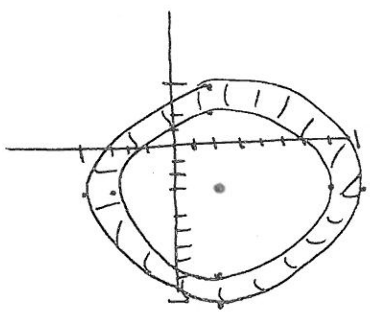
$5xy - 3x = 3y - 2$

$5xy - 3y = 3x - 2$

$y(5x-3) = 3x-2$

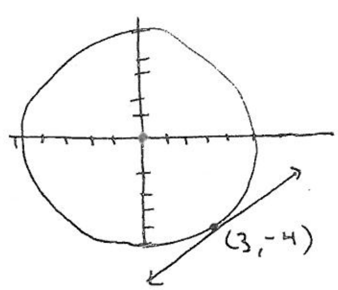
$y = \dfrac{3x-2}{5x-3} = f^{-1}(x)$

15. Find the area of the donut-shaped region bounded by the graphs of $(x-2)^2+(y+3)^2=25$ and $(x-2)^2+(y+3)^2=36$.



$36\pi - 25\pi = \boxed{11\pi}$

16. Write the equation of the line tangent to the circle $x^2+y^2=25$ at the point (3,-4).



SLOPE OF RADIUS $= -\frac{4}{3}$

SLOPE OF TANGENT $= \frac{3}{4}$

$-4 = \frac{3}{4} \cdot 3 + b$

$-16 = 9 + 4b$

$-25 = 4b$

$-\frac{25}{4} = b$

$\boxed{y = \frac{3}{4}x - \frac{25}{4}}$