Name Key Date ________________ Pd ___

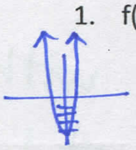
Domain Restriction Practice WS

REMINDER: 3 rules when domain restriction is necessary.

1. Denominators cannot equal zero. So, set the denominator ≠ 0 and solve. If a quadratic or higher degreed function factor first and set each factor ≠ 0. It can be more than one number that is restricted.
2. Since the even root of a negative number creates imaginary numbers we need to ensure that any even rooted radicand is ≥ 0. This guarantees any radicand will not be negative.
3. This situation is a combination of the first two rules. When the first two rules are combined you cannot have a negative under a radical and you cannot have a value of zero in the denominator. So, we combine the two methods and set the denominator > 0 because it cannot be negative and it can no longer = 0.

Determine the domain for each function provided. Remember the rules above as well as real-world restrictions when applicable.

1. $f(x) = 3x^2 - 4$



No Rule applies.

$\boxed{D: (-\infty, \infty)}$

2. $h(x) = \frac{2x+1}{x-1}$ Rule # 1

$x - 1 \neq 0$
$+1 \quad +1$
$x \neq 1$

$\boxed{D: (-\infty, 1) \cup (1, \infty)}$

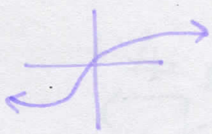
3. $g(x) = \sqrt{2x - 5}$ Rule #2

$2x - \cancel{5} \geq 0$
$+\cancel{5} \quad +5$
$2x \geq 5$
$x \geq \frac{5}{2}$

$\boxed{D: \left[\frac{5}{2}, \infty\right)}$

4. $z(x) = \sqrt[3]{10x - 2}$

No Rule applies (odd $\sqrt{\ }$)



$\boxed{D: (-\infty, \infty)}$

5. $w(x) = \frac{3}{x} + \frac{3}{x-1} + \frac{3}{x+1}$ Rule #1

$x \neq 0$ $\quad x - 1 \neq 0$ $\quad x + 1 \neq 0$
$x \neq 1$ $\quad x \neq -1$

$\boxed{D: (-\infty, -1) \cup (-1, 0) \cup (0, 1) \cup (1, \infty)}$

6. $m(x) = \frac{\sqrt{1-x}}{\sqrt{1+x}}$ Rule # 3

$1 + x > 0$
$x > -1$

$\boxed{D: (-1, \infty)}$

7. $n(x) = \sqrt{x^2 - 5x + 6}$ Rule #2

$= \sqrt{(x-3)(x-2)}$

$\boxed{D: [3, \infty)}$

$x-3 \geq 0$ $x-2 \geq 0$

$x \geq 3$ $x \geq 2$

8. $c(x) = \frac{1}{x^2-8x+12}$. Rule #1

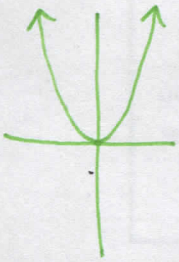
$(x-6)(x-2)$

$x-6 \neq 0$ $x-2 \neq 0$

$x \neq 6$ $x \neq 2$

$\boxed{D: (-\infty, 2) \cup (2, 6) \cup (6, \infty)}$

9. $v(t) = 1000 - \frac{1}{2}(-32.2)t^2$



No Rule Applies.

$\boxed{D: (-\infty, \infty)}$

10. In the previous problem, if the function represents real-time velocity of an object t seconds after launch, how does that change the domain restriction?

only positive values would work

$D: [0, \infty)$

11. $j(x) = \sqrt{\frac{x-2}{x+3}}$ Rule #3

$= \frac{\sqrt{x-2}}{\sqrt{x+3}}$

$x+3 > 0$

$x > -3$

$\boxed{D: (-3, \infty)}$

12. $f(x) = \frac{\cancel{(2x+3)}(x-3)}{\cancel{(2x+3)}} = x-3$ with hole

Rule #1

$2x+3 \neq 0$

$2x \neq -3$

$x \neq -\frac{3}{2}$

$\boxed{D: \left(-\infty, -\frac{3}{2}\right) \cup \left(-\frac{3}{2}, \infty\right)}$

13. $k(x) = \sqrt[5]{\frac{x}{x-1}}$ Rule #1 (odd $\sqrt{\ }$)

$\frac{\sqrt[5]{x}}{\sqrt[5]{x-1}}$

$x-1 \neq 0$

$x \neq 1$

$\boxed{D: (-\infty, 1) \cup (1, \infty)}$

14. $q(x) = \sqrt{x^3 + 4x^2 - 4x - 16}$ Rule #2

$\sqrt{x^2(x+4) - 4(x+4)}$

$\sqrt{(x^2-4)(x+4)}$

$\sqrt{(x+2)(x-2)(x+4)}$

$x+2 \geq 0$ $x-2 \geq 0$ $x+4 \geq 0$

$x \geq -2$ $x \geq +2$ $x \geq -4$

$\boxed{D: [2, \infty)}$

15. $p(x) = \sqrt{\frac{x^2-1}{x^2-4}}$ Rule #3

$= \frac{\sqrt{x^2-1}}{\sqrt{x^2-4}}$

$\boxed{D: (2, \infty)}$

$x^2 - 4 > 0$

$x^2 > 4$

$x > \pm 2$