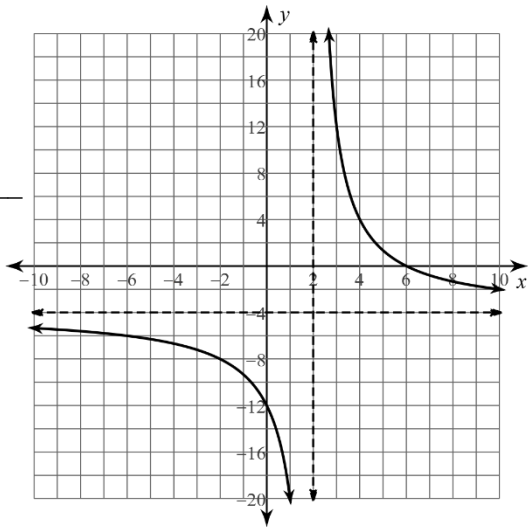
Unit 8 Lesson 8 HW **Name:** _____

I. Key Features and Transformations of Rational Functions

1. The parent function $f(x) = \frac{1}{x}$ is stretched vertically by a scale factor of 16, translated right 2 units and down 4 units to create $g(x)$. Write and graph the new function. Identify the following key features.



Equation:

Vertical Asymptote: _____ Horizontal Asymptote: _____

Domain: _____ Range: _____

Increasing: _____ x-intercept: _____

Decreasing: _____ y-intercept: _____

2. Write the equation of the rational function with the following key features.

Domain: All real numbers except $x = 0$
Range: All real numbers except $y = 1$
Increasing: All real numbers except $x = 0$
Vertical compression by a scale factor of ½

Equation:

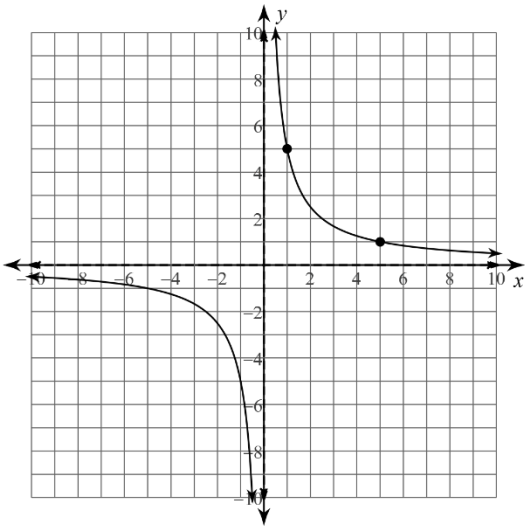
II. Writing and Comparing Inverse Variation Equations

3. Write an equation to represent the relationship in the table.

x	$f(x)$
-2	-6
-1	-12
0	Undefined
1	12
2	6

Equation:

4. Write the equation to represent the graph.



Equation:

5. Determine which of the following could be inverse variation functions. Circle all that apply.

A. A rational function with asymptotes $x = 2$ and $y = 0$

B. A rational function that is stretched vertically by a scale factor of 5

C. A rational function that passes through $(1,3)$ and is undefined at $x = 0$

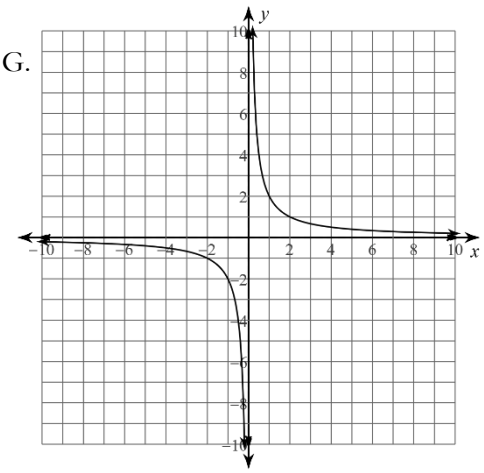
D. $g(x) = \frac{1}{x-2}$

E. $h(x) = -\frac{5}{x}$

F.

x	$f(x)$
-2	1.5
-1	1
0	undefined
1	3
2	2.5

G.



III. Review of Simplifying Expressions Containing Radicals and Rational Exponents

Simplify each expression. Leave your answers as rational exponents if necessary.

6. $(16n^4)^{-0.25}$

7. $\left(\frac{49a^4b^{\frac{2}{3}}}{\sqrt[3]{b^2}}\right)^{-\frac{1}{2}}$

8. $\sqrt[5]{w^{\frac{3}{4}}x^3y^0}$

9. $\left(\sqrt[4]{16x^7y}\right)^3(-2xy^3)^4$

10. $\frac{\sqrt{100a^3b^{-2}c}}{\left(5a^{\frac{1}{3}}b\right)^2(abc)^3}$

11. $(x^2y^{-3}w^4)^{-2} \cdot (4xy^{\frac{1}{2}})^2$

IV. Rewrite as a radical. Do no simplify.

12. $3(x^2y)^{\frac{2}{5}}$

13. $-4(2ab^3)^{-\frac{2}{7}}$

14. $(-p^3q)^{\frac{1}{2}}$

V. Rewrite as a rational exponent. Do not simplify.

15. $2\sqrt[3]{ab^2}$

16. $\frac{1}{\sqrt{3x}}$

17. $\left(\sqrt[n]{25c^d}\right)^g$

VI. Solve.

18. $(6x)^{\frac{1}{2}} = 6$

19. $x = (-1 - 2x)^{\frac{1}{2}}$

20. $(b + 3)^{\frac{1}{2}} = (-3 - 2b)^{\mathbf{0.5}}$

VII. Solve. (DESMOS Active)

21. $16^{2-x} = 64$

22. $6^{-2x} = 6^{x+3}$