Name:_____ Date:_____

Pre Calculus 12 Section 2.4 Reciprocal Functions:

1. What does it mean to take the reciprocal of a number? Explain:

2. If the coordinate (a,b) is on the function $y = f(x)$, what will this coordinate become on the function $y = \frac{1}{f(x)}$?

3. When you take the reciprocal of a function, what happens to the equation?

4. What is a vertical asymptote? How do you find the vertical asymptotes of a reciprocal function?

5. If you taking the reciprocal function, how many vertical asymptotes can you have? Explain:

6. Suppose you are given a horizontal line $y = 5$, what would the reciprocal of this function become?

7. Suppose you are given a linear function, $y = mx + b$, how do you find the domain and range of the reciprocal of this function? Explain:

8. Suppose you are given a quadratic function, $y = x^2 - k$, how do you find the domain and range of the reciprocal of this function? Explain:

9. Suppose you are given the following coordinates on $y = f(x)$, what will these coordinates become on $y = \frac{1}{f(x)}$?

$i(5,-1)$ ii $(3,-2)$ iii $(10,20)$ iv $\left(6,-\frac{2}{3}\right)$ v $\left(\frac{4}{7},\frac{9}{4}\right)$ vi $(0,-1)$ vi $(-1,0.004)$

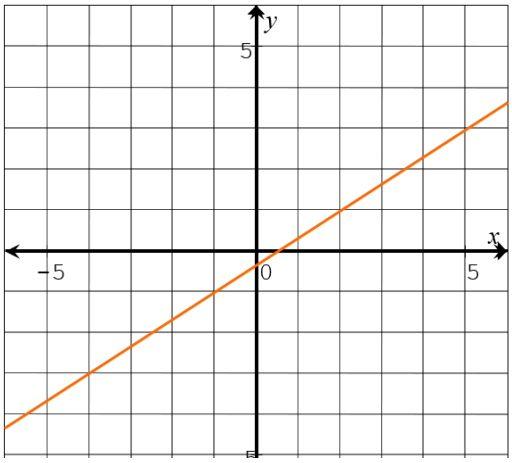
10. How do you find the invariant points of a reciprocal function? Explain:

11. Given each of the following reciprocal functions, Find the equation of the vertical asymptotes and the coordinates of ALL the invariant points?

a) $y = \frac{1}{5x-9}$	b) $y = \frac{1}{\frac{2}{3}x-11}$
c) $y = \frac{1}{2x^2-9}$	d) $y = \frac{1}{(x-3)^2-16}$
e) $y = \frac{1}{8x^2-10x-3}$	f) $y = \frac{1}{2x^2-7x-15}$

12. Given the graph of $y = f(x)$, graph the reciprocal function $y = \dfrac{1}{f(x)}$ on the same graph. Label the vertical asymptotes and the invariant points on the graph:

a)



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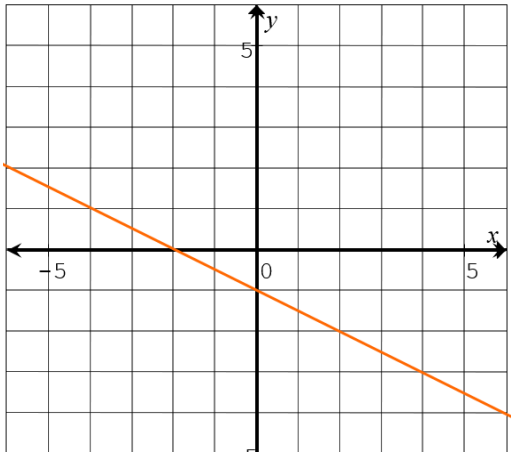

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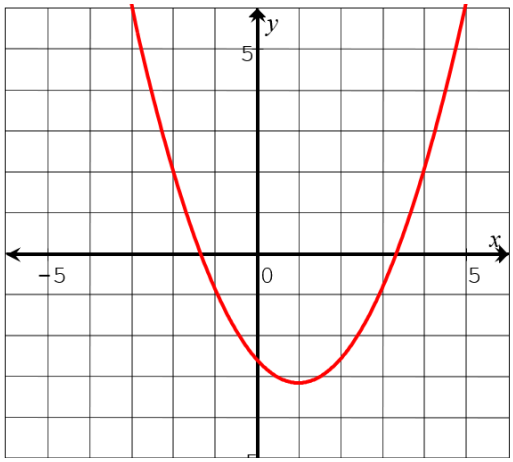

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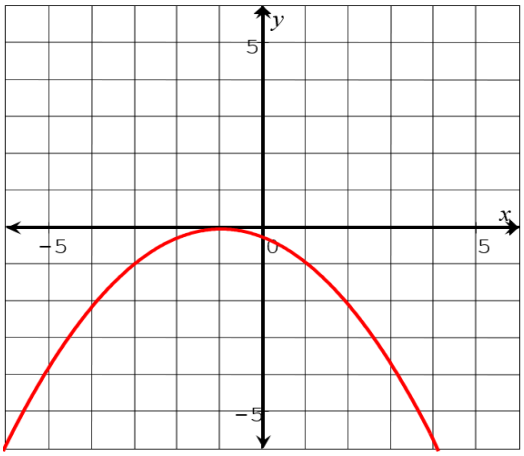

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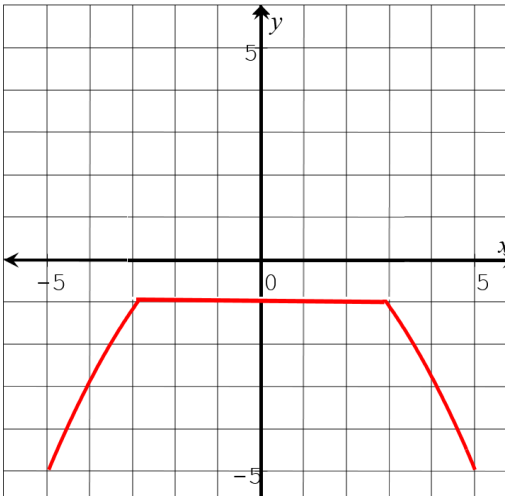

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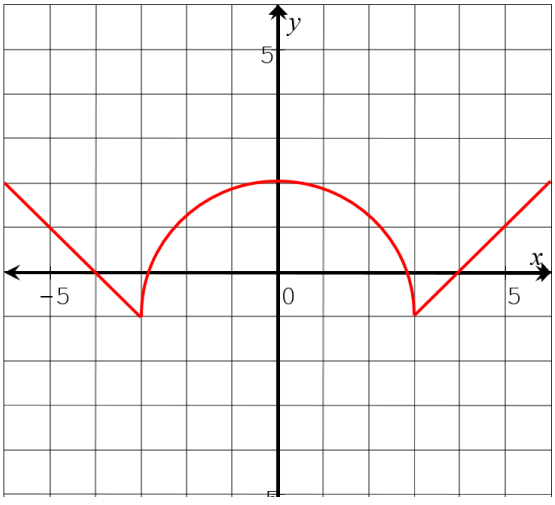
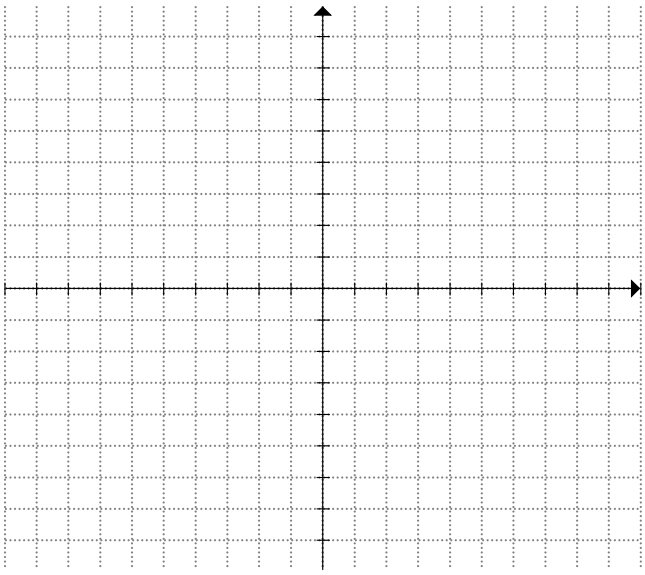


13. Graph the each of the following reciprocal functions. Indicate the asymptotes, coordinates of the invariant points, domain and range:

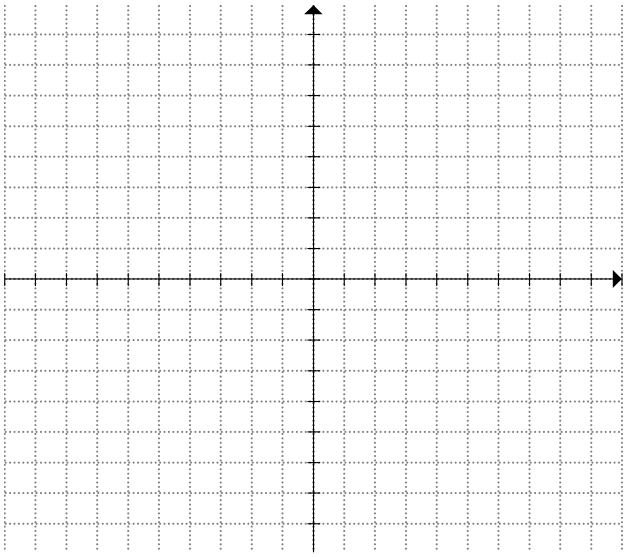
$y = \frac{1}{\frac{1}{2}x - 6}$ Invariant Points:



Domain and Range:

Equations of Asymptotes:

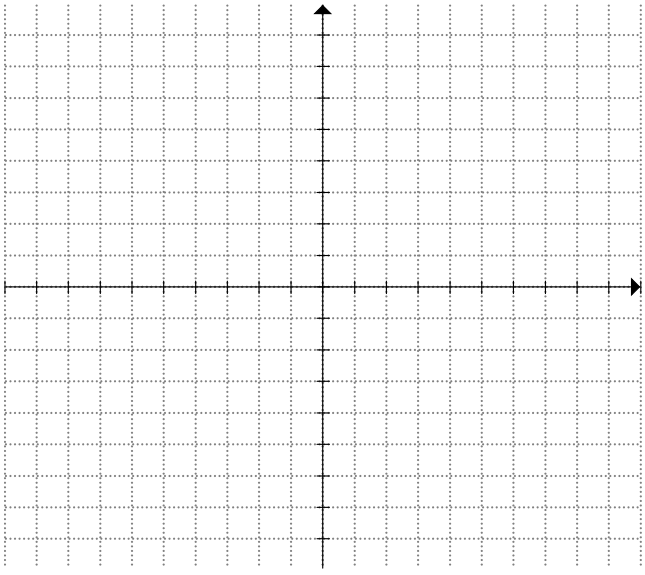
$y = -\frac{1}{\frac{-3}{4}x + 4}$ Invariant Points



Domain and Range:

Equations of Asymptotes

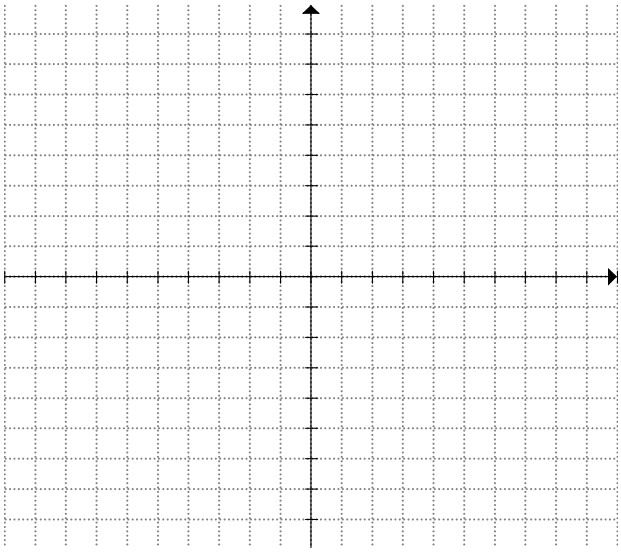
$y = \frac{1}{(x-1)^2 - 4}$ Invariant Points



Domain and Range:

Equations of Asymptotes:

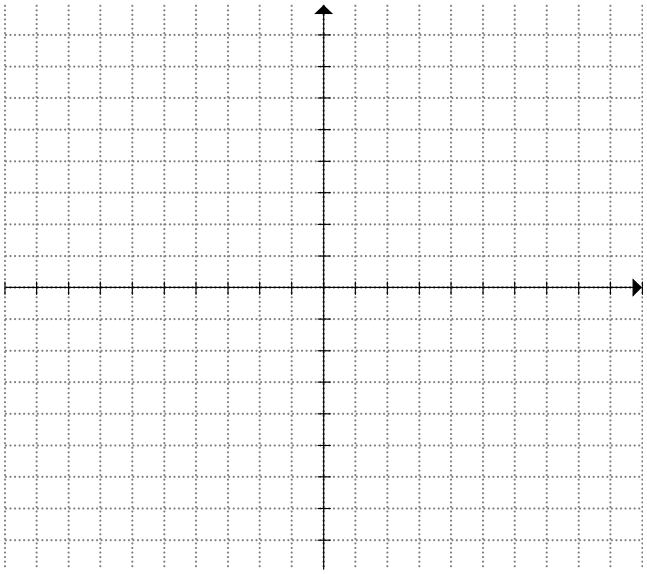
$y = \frac{1}{-(x-4)^2 + 9}$ Invariant Points



Domain and Range:

Equations of Asymptotes

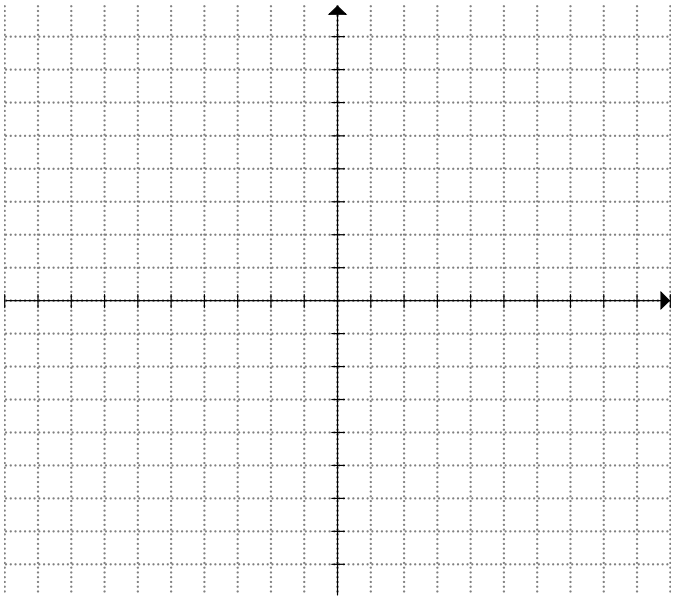
$y = \dfrac{1}{2(x-3)^2 - 8}$ Invariant Points:



Domain and Range:

Equations of Asymptotes:

$y = \dfrac{1}{-2x^2 + 10}$ Invariant Points:



Domain and Range:

Equations of Asymptotes:

14. Match each reciprocal function with the correct domain and range on the right:

Functions:	ANSWER		CHOICES	
	Domain Range:		DOMAINS	RANGES:
a) $y = \dfrac{1}{3x-5}$			i) $x \in \mathbb{R}$ ii) $x \in \mathbb{R}; x \neq 2$	I) $y \in \mathbb{R}; y \neq 0$ II) $y \in \mathbb{R}; y \neq \dfrac{5}{3}$
b) $y = \dfrac{1}{2x-4}$			iii) $x \in \mathbb{R}; x \neq 1,5$ iv) $x \in \mathbb{R}; x \neq 5,-1$	III) $y \in \mathbb{R}$
c) $y = \dfrac{1}{(x-2)^2 - 9}$			v) $x \in \mathbb{R}; x \neq \dfrac{3}{5}$ vi) $x \in \mathbb{R}; x \neq -1,-7$	IV) $y > 0, y \leq -\dfrac{1}{9}$ v) $y > 0, y < -\dfrac{1}{9}$
d) $y = \dfrac{1}{(x-3)^2 - 4}$			Vii) $x \in \mathbb{R}; x \neq \dfrac{1}{2}$ viii) $x \in \mathbb{R}; x \neq 1,7$	vi) $y > 0, y \leq -\dfrac{1}{4}$ vii) $y < 0, y \geq \dfrac{1}{18}$
e) $y = \dfrac{1}{-2(x-4)^2 + 18}$			ix) $x \in \mathbb{R}; x \neq 1,5$	viii) $y > 0, y \leq \dfrac{1}{9}$