4-1 Lesson Quiz

Inverse Variation and the Reciprocal Function

1. The chart represents an inverse variation. Find the value of p.

x	3	10	15	30
y	5	p	1	0.5

2. Write an equation for the inverse variation represented by the table.

x	−3	−1	$\frac{1}{2}$	$\frac{2}{3}$
y	4	12	−24	−18

3. Three students can wash a car in 16 minutes. If the time varies inversely with the number of students washing the car, how many minutes will it take two students to complete that same job?

Ⓐ 20

Ⓑ 22

Ⓒ 24

Ⓓ 24

4. What is the equation of the horizontal asymptote of the graph of $y = \frac{1}{x+5} - 4$?

5. The graph of $y = \frac{1}{x}$ is translated 3 units up and 2 units to the left. What is an equation of the translated graph?

Ⓐ $y = \frac{1}{x+2} + 3$

Ⓑ $y = \frac{1}{x-2} + 3$

Ⓒ $y = \frac{1}{x-3} + 2$

Ⓓ $y = \frac{1}{x+3} - 2$

4-1 A few more problems:

① P varies inversely with x.
If P = 12 when x = 4,
Find the value of P when x = 8.

what if P = 5 when x = 7?
Now find the value of P
when x = 5.

② Which equations model inverse variation?

A. $xy = 36$

B. $x = 36y$

C. $y = \dfrac{36}{x}$

D. $xy - 36 = 0$

E. $x = \dfrac{36}{y}$

F. $x = \dfrac{y}{36}$

Now you try: (this group has
                  different
                  constants)

A. $y = 10x$

B. $xy + 14 = 0$

C. $xy = 26$

D. $y = \dfrac{x}{4}$

E. $y = \dfrac{4}{x}$

F. $x = \dfrac{30}{y}$

③ Describe the transformations from
the parent graph $y = \dfrac{1}{x}$ to $y = \dfrac{1}{x+7} - 5$
what is the vertical asymptote?
What is the horizontal asymptote?

Now try:

$y = \dfrac{1}{x-3} + 2$

Transformations: ° _____

° _____

V.A. = _____

H.A. = _____

Transformations

° _____

° _____

V.A. _____

H.A. _____

④ The graph of $xy = 8$ is translated up 3 and
to the right 7. Write the new equation.

4-1 Additional Practice

Inverse Variation and the Reciprocal Function

Do the tables below represent a direct variation or an inverse variation? Explain.

1.

x	y
2	10
4	5
5	4
20	1

2.

x	y
1	6
2	12
5	30
7	42

3.

x	y
0.2	25
0.5	62.5
2	250
3	375

Suppose x and y vary inversely. Write an equation that models each inverse variation. Find y when $x = 10$.
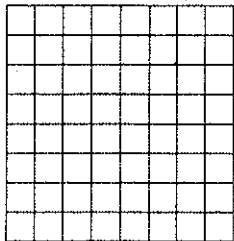
4. $x = 7$ when $y = 2$ **5.** $x = 4$ when $y = 0.2$ **6.** $x = 2$ when $y = 5$

Graph each function. Identify the asymptotes of each graph and state the domain and the range of each function.
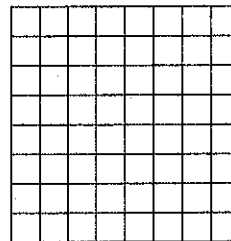
7. $f(x) = \dfrac{12}{x}$

Asymptotes:

Domain:

Range:

8. $f(x) = \dfrac{1}{x} + 3$

Asymptotes:

Domain:

Range:

9. The length of a pipe in a panpipe ℓ, in ft, is inversely proportional to its pitch p, in hertz. The inverse variation is modeled by the equation $p = \dfrac{497}{\ell}$. Find the length of pipe required to produce a pitch of 220 Hz.

10. From the table of values, how can you determine that the data do not represent an inverse variation?

x	−4	−2	2	4	6	8
y	100	100	100	50	25	20