

Performance Assessment Teacher Support***Properties and Attributes of Functions*****Purpose:**

To assess student understanding of inverse functions.

Time:

20–30 minutes

Grouping:

Individuals or partners

Preparation Hints:

Review how to find the inverse of a function.

Introduce the Task:

Students are presented with a rational function. They are asked to find the inverse and the domain and range of the inverse.

Performance Indicators:

_____ Correctly finds the inverse.

_____ Identifies the domain of the inverse.

_____ Identifies the range of the inverse.

_____ Shows understanding of the relationship between the domain and range and features of the graph of the inverse function.

Scoring Rubric:

Level 4: Student solves problems correctly and gives good explanations.

Level 3: Student solves problems but does not give satisfactory explanations.

Level 2: Student solves some problems but does not give satisfactory explanations.

Level 1: Student is not able to solve any of the problems.

CHAPTER **Performance Assessment**

9 ***Properties and Attributes of Functions***

Given the function $f(x) = \frac{3 - x}{2x - 1}$, find the inverse function and the domain and range of the inverse function.

1. Switch the variables and solve in order to find the inverse.

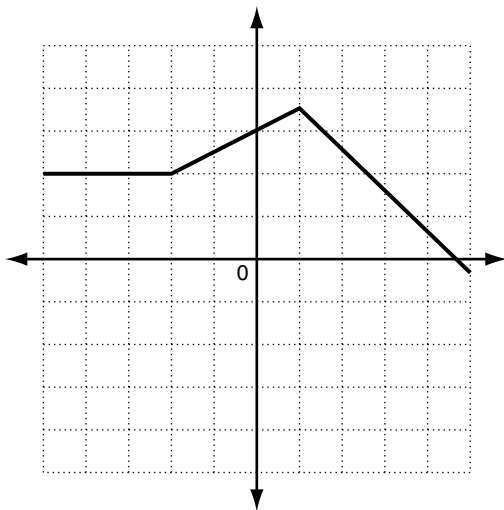
2. What is the domain of the inverse function? Why?

3. What is the range of the inverse function? Why?

4. How do the domain and range restrictions manifest themselves in the graph of the inverse function?

5. How else could you know that there is a horizontal asymptote at $y = \frac{1}{2}$?

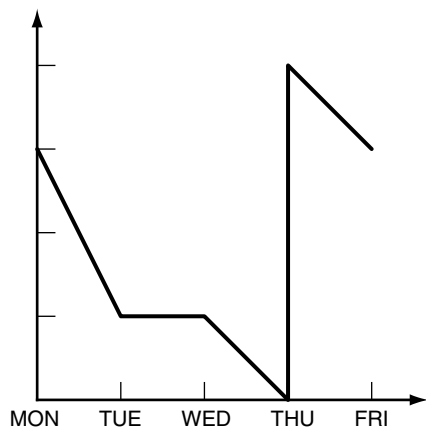
5.



6. $g(x) = \begin{cases} x - 2 & \text{if } x > 0 \\ 2x - 2 & \text{if } x \leq 0 \end{cases}$
7. x-intercept: -12 ; y-intercept: 12
8. $g(x) = \begin{cases} 16x + 3 & \text{if } x < 8 \\ -48x + 16 & \text{if } x \geq 8 \end{cases}$
9. $(f - g)(x) = 3x^2 + 8x - 3$
10. $(gf)(x) = -2x^3 + 17x^2 - 25x + 28$
11. $g(f(3)) = 57$
12. $g(f(x)) = \frac{5x + 13}{x + 2}$
13. $y = \pm 3\sqrt{x} + 4$, it is not a function,
D: $\{x \mid x \geq 0\}$; R: \mathbb{R}
14. They are not inverses.
15. square root
16. linear

Chapter Test Form C

1. Answers may vary. Sample graph:

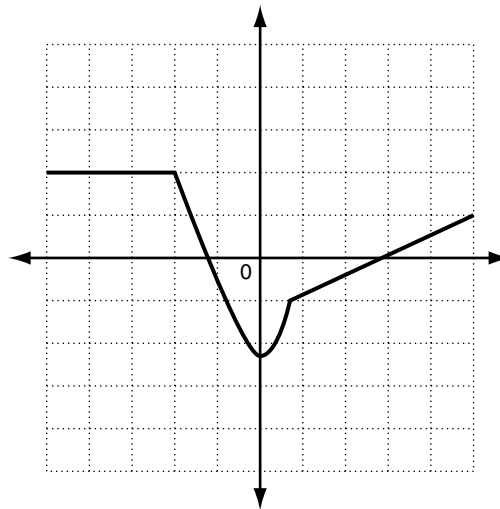


2. Answers may vary. Sample answer: The volume of a box whose length is x , width is twice the length, and height is 5 times the length.

3. $w(t) = t^2 + 1$ or $t(w) = \sqrt{w - 1}$

4. $f(\sqrt{2}) = 4$

5.



6. $g(x) = \begin{cases} -3x^2 - 24 & \text{if } x > 0 \\ -3x^4 - 24 & \text{if } x \leq 0 \end{cases}$

7. $a = 5$

8. $g(x) = \begin{cases} 4x + 11 & \text{if } x < 8 \\ x^2 + 4x + 4 & \text{if } x \geq 8 \end{cases}$

9. $(f + g)(x) = \frac{2x + 5}{(x + 3)(x + 2)}$

10. $\left(\frac{f}{g}\right)(x) = x - 2$

11. $f(g(h(3))) = 36$

12. $h(f(g(x))) = \frac{1}{(3x + 7)^2}$

13. $y = 3 + \ln x$, it is a function,
D: $\{x \mid x > 0\}$; R: \mathbb{R}

14. They are inverses.

15. exponential

16. $a = -4$, $b = -18$

Performance Assessment

1. $f(x) = \frac{3 - x}{2x - 1}$; $x = \frac{3 - y}{2y - 1}$;
 $2xy - x = 3 - y$; $2xy + y = 3 + x$;
 $y(2x + 1) = 3 + x$; $y = f^{-1}(x) = \frac{x + 3}{2x + 1}$

Answer Key continued

2. $D: x \neq -\frac{1}{2}$. Denominator cannot be zero.
3. $R: y \neq \frac{1}{2}$. The range of a function is equal to the domain of its inverse.
4. horizontal and vertical asymptotes
5. The numerator and denominator of the inverse function have the same degree, and the ratio of the leading coefficients is $\frac{1}{2}$.

Cumulative Test

1. C
2. F
3. C
4. J
5. B
6. J
7. B
8. H
9. C
10. G
11. D
12. F
13. C
14. J
15. C
16. J
17. C
18. G
19. D
20. F
21. C
22. G
23. A
24. H
25. D

26. G
27. B
28. H
29. A
30. F
31. A
32. F
33. D
34. H
35. A
36. H
37. A
38. H
39. A
40. H
41. A
42. D

CHAPTER 10

Section Quiz: Lessons 10-1 to 10-5

1. B
2. G
3. C
4. G
5. C
6. J
7. A
8. H
9. D

Section Quiz: Lessons 10-6 to 10-7

1. C
2. J
3. D
4. H