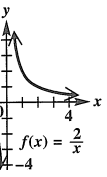
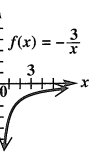
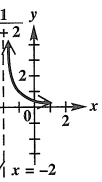
cises 17–28, we give the
and then the range below
ph.
obtain the graph of f,
the graph of $y = \frac{1}{x}$
ly by a factor of 2.



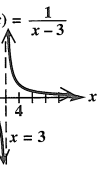
$) \cup (0, \infty)$;
$) \cup (0, \infty)$
obtain the graph of f,
the graph of $y = \frac{1}{x}$
lly by a factor of 3 and
across the x-axis *or* the



$) \cup (0, \infty)$;
$) \cup (0, \infty)$
obtain the graph of f,
e graph of $y = \frac{1}{x}$ to the
nits.



$-2) \cup (-2, \infty)$;
$) \cup (0, \infty)$
obtain the graph of f,
ne graph of $y = \frac{1}{x}$ to the
units.



$) \cup (3, \infty)$;
$) \cup (0, \infty)$

7. Is $f(x) = \frac{1}{x^2}$ an even or odd function? What symmetry does its graph exhibit?

8. Is $f(x) = \frac{1}{x}$ an even or odd function? What symmetry does its graph exhibit?

Concept Check *Use the graphs of the rational functions in A–D to answer each question. Give all possible answers, as there may be more than one correct choice.*

9. Which choices have domain $(-\infty, 3) \cup (3, \infty)$?

10. Which choices have range $(-\infty, 3) \cup (3, \infty)$?

11. Which choices have range $(-\infty, 0) \cup (0, \infty)$?

12. Which choices have range $(0, \infty)$?

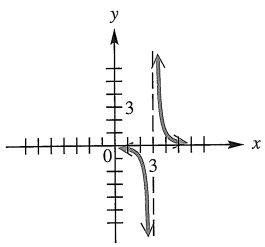
13. If f represents the function, only one choice has a single solution to the equation $f(x) = 3$. Which one is it?

14. What is the range of the function in B?

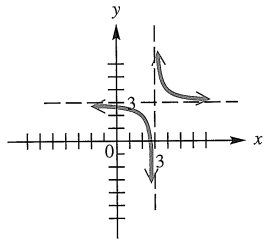
15. Which choices have the x-axis as a horizontal asymptote?

16. Which choices are symmetric with respect to a vertical line?

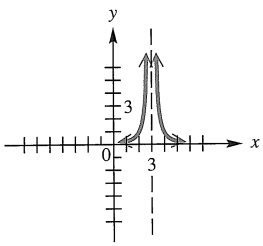
A.



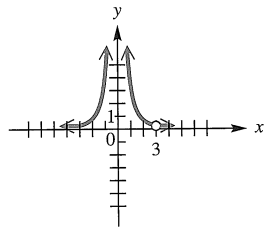
B.



C.



D.



Explain how the graph of each function can be obtained from the graph of $y = \frac{1}{x}$ or $y = \frac{1}{x^2}$. Then graph f and give the domain and range. See Examples 1–3.

17. $f(x) = \frac{2}{x}$

18. $f(x) = -\frac{3}{x}$

19. $f(x) = \frac{1}{x + 2}$

20. $f(x) = \frac{1}{x - 3}$

21. $f(x) = \frac{1}{x} + 1$

22. $f(x) = \frac{1}{x} - 2$

23. $f(x) = -\frac{2}{x^2}$

24. $f(x) = \frac{1}{x^2} + 3$

25. $f(x) = \frac{1}{(x - 3)^2}$

26. $f(x) = \frac{-2}{(x - 3)^2}$

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

28. $f(x) = \frac{-1}{(x - 4)^2} + 2$