

For the given function, find all asymptotes of the type indicated (if there are any).

1) $f(x) = \frac{x-9}{x^2+7}$, vertical

2) $f(x) = \frac{x-9}{x^2-25}$, vertical

3) $f(x) = \frac{x^2+9x-3}{x-5}$, oblique

4) $f(x) = \frac{x+7}{9x^2+6x-4}$, oblique

5) $f(x) = \frac{x^2+2x+9}{x+9}$, oblique

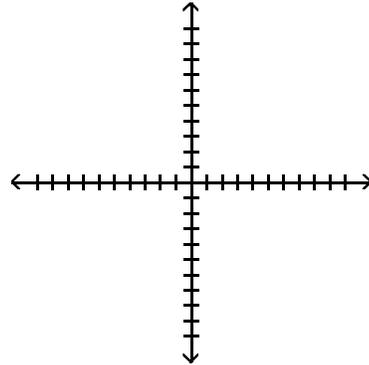
6) $f(x) = \frac{7x^2+3}{7x^2-3}$, horizontal

7) $f(x) = \frac{7x^2-8x-8}{4x^2-5x+8}$, horizontal

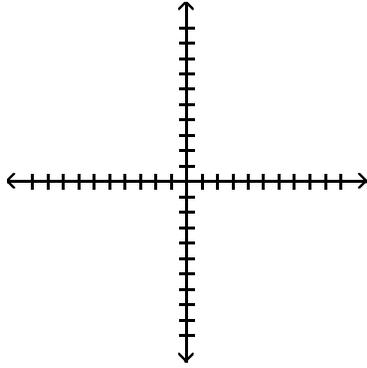
8) $f(x) = \frac{x^2+2x-1}{x-1}$, horizontal

Graph the function.

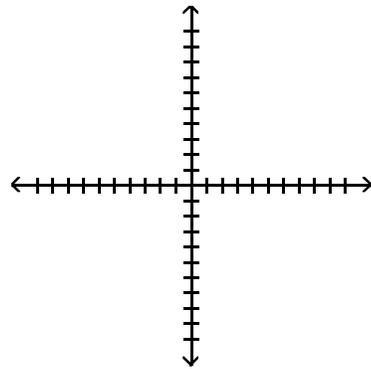
9) $f(x) = \frac{1}{x-3}$



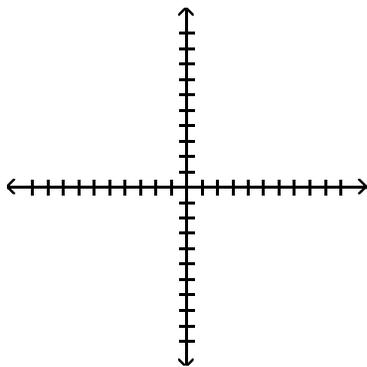
$$10) f(x) = \frac{-4}{x-6}$$



$$12) f(x) = \frac{x^2}{x^2 - x - 12}$$



$$11) f(x) = \frac{x^2 - 16}{x + 2}$$



Explain the behavior of the graph of $f(x)$ as it approaches its vertical asymptote.

$$13) f(x) = \frac{2}{(x-1)^2}$$

$$14) f(x) = \frac{2}{x-1}$$

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

Provide an appropriate response.

- 16) Fill in the blank to complete the statement. For the polynomial function

$$P(x) = -8.6x^3 - 4.3x^2 + 16.4x - 24.4, \text{ as } x \rightarrow \infty,$$

$$P(x) \rightarrow \underline{\hspace{2cm}}.$$

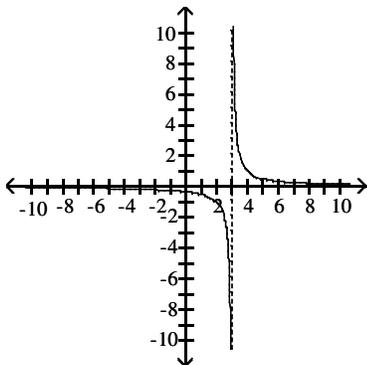
- 17) Fill in the blanks to complete the statement. A polynomial function of degree 7 has at least ___ x-intercept(s) and at most _____ x-intercept(s).

- 18) Let P be a polynomial function with real coefficients. If -3 , 4 , $-1 + 5i$, and $5 - 3i$ are zeros of P, what is the smallest possible degree that P can have?

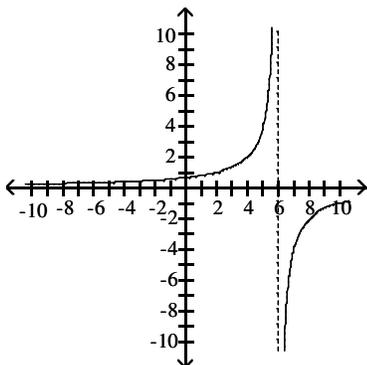
- 19) Is it possible to have a polynomial function whose only zeros are 6 and i ? If so, write such a function. If not, explain why.

Answer Key
 Testname: 3.5PRAC

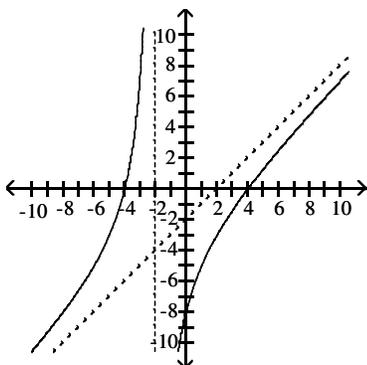
- 1) None
- 2) $x = 5, x = -5$
- 3) $y = x + 14$
- 4) None
- 5) $y = x - 7$
- 6) $y = 1$
- 7) $y = 7/4$
- 8) None
- 9)



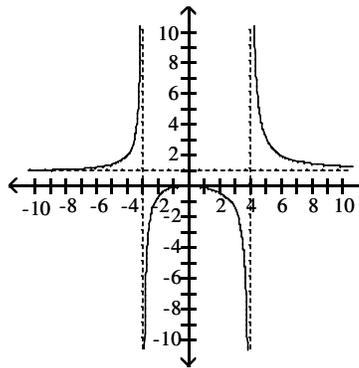
10)



11)



12)



- 13) Approaches ∞ from the left and the right
- 14) Approaches $-\infty$ from the left, approaches ∞ from the right
- 15) Approaches $-\infty$ from the left and the right
- 16) $-\infty$
- 17) 1; 7
- 18) 6
- 19) Yes; $P(x) = x^2 - (6 + i)x + 6i$ is such a function.