

Practice Test 6

Graphing Rational Functions/Quadratics

Factor completely.

1. $9 - x^2y^2$

2. $3x^2 + 30x + 75$

3. $a^3b^2c - a^2b^2c^2$

4. $x^3 + 3x^2 - 4x - 12$

For each function, find the domain and vertical and horizontal asymptotes (if any). For the asymptotes, your answer must be the equation of the line, not just a number.

5. $f(x) = \frac{1}{x^2}$

6. $f(x) = \frac{-1}{x+4} + 3$

Domain:

Domain:

Vertical Asymptote:

Vertical Asymptote:

Horizontal Asymptote:

Horizontal Asymptote:

7. $f(x) = \frac{2x^2+8x+6}{x^2+2x-3}$

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

Domain:

Domain:

Vertical Asymptote:

Vertical Asymptote:

Horizontal Asymptote:

Horizontal Asymptote:

Fill in the blank to make each trinomial a perfect square and factor.

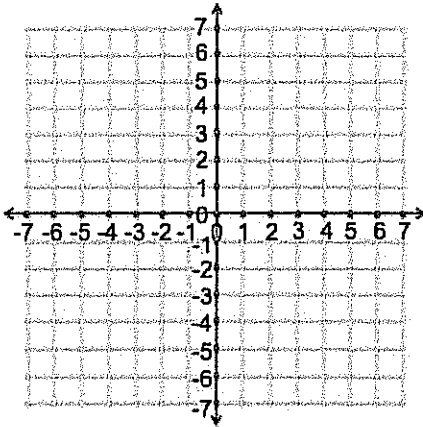
9. $x^2 + 2x + \underline{\hspace{1cm}} =$

10. $x^2 - \frac{2}{3}x + \underline{\hspace{1cm}} =$

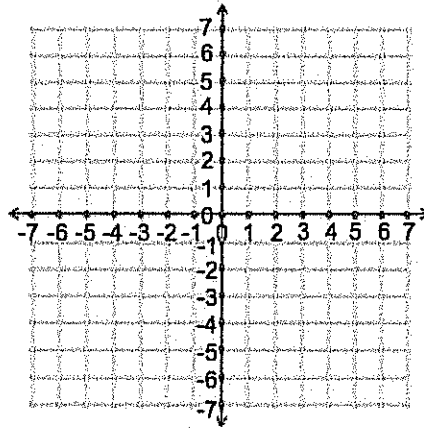
11. Let $f(x) = \frac{P(x)}{Q(x)}$, where $P(x)$ and $Q(x)$ are polynomials. If n is a root of Q , and f does not have a vertical asymptote at $x = n$, what must be true of $P(n)$? Explain.

Graph each function. If there are any asymptotes, label them.

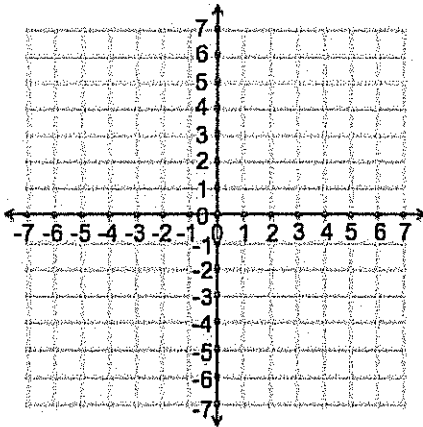
12. $f(x) = \frac{-3}{(2x-3)^2}$



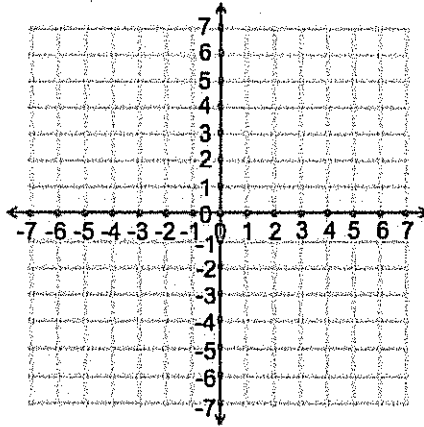
13. $f(x) = \frac{x+1}{x^2+5x+4} + 1$



14. $f(x) = \frac{x+1}{2x-6}$



15. $f(x) = \frac{x^4+5x^3+6x^2}{x}$



16. a) List all possible rational roots of the polynomial $x^4 + x^3 - 3x^2 - x + 2$, according to the rational root theorem.

b) Find which of your answers to the previous question are actually roots of the polynomial.

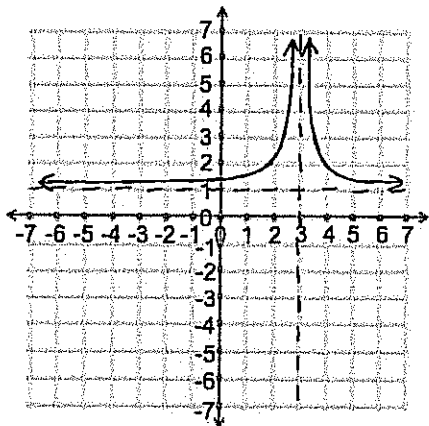
Solve for x by completing the square.

17. $x^2 - 2x - 5 = 0$

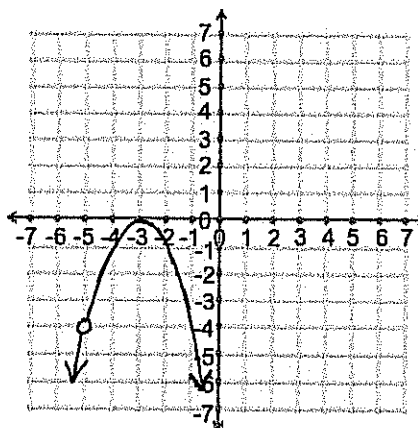
18. $x^2 = -9 - 10x$

What functions are given in each graph?

19. $f(x) =$



20. $f(x) =$



Extra Credit. Create a function that has a domain of $\{x \in \mathbb{R} | x \neq -2, 0\}$, a vertical asymptote of $x = -2$, a horizontal asymptote of $y = 3$, and an x -intercept of $(-1, 0)$. Then graph your function.

$f(x) =$

