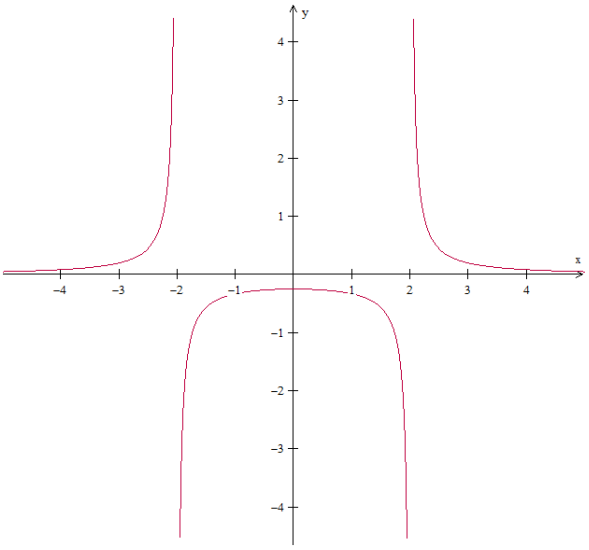
Homework: Rational Zeros and Their Graphs

In Problems 1-4, find the domain of each rational function

1. $f(x)=\dfrac{9x-1}{8x+2}$	2. $f(x)=\dfrac{x}{(x-6)(x+3)}$
3. $f(x)=\dfrac{x+3}{x^2-10x+16}$	4. $f(x)=\dfrac{7x+5}{x^2+3}$

In Problems 5-7, use the graph of the rational function in the figure shown to complete each statement



5. $As \quad x\to -2^-, \qquad f(x)\to$ _____	6. $As \quad x\to \infty, \qquad f(x)\to$ _____
7. $As \quad x\to -2^+, \qquad f(x)\to$ _____	8. $As \quad x\to -\infty, \qquad f(x)\to$ _____
9. $As \quad x\to 2^+, \qquad f(x)\to$ _____	10. $As \quad x\to 2^-, \qquad f(x)\to$ _____

In Problems 11-14, find the vertical asymptotes, if any, of the graph of each rational function

11. $f(x)=\dfrac{x+2}{x-5}$	12. $f(x)=\dfrac{x-7}{x(x-2)}$
13. $f(x)=\dfrac{x+1}{(x+1)(x+5)}$	14. $f(x)=\dfrac{3}{x^2+1}$

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In Problems 15-18, find the horizontal asymptote, if any, of the graph of each rational function

15. $f(x)=\dfrac{1}{x^2-9}$	16. $f(x)=\dfrac{7x^2-1}{2x^2+3}$
17. $f(x)=\dfrac{x^3}{x-1}$	18. $f(x)=\dfrac{4x+2}{3x+1}$

In Problems 19-24, describe the transformation(s) from the basic graph of $f(x)=\dfrac{1}{x}$ or $f(x)=\dfrac{1}{x^2}$

19. $f(x)=\dfrac{1}{x^2}-2$	20. $f(x)=\dfrac{1}{x}-4$
21. $f(x)=\dfrac{1}{x-1}+3$	22. $f(x)=\dfrac{1}{(x-5)^2}-2$
23. $f(x)=\dfrac{1}{x+2}+3$	24. $f(x)=\dfrac{1}{(x+1)^2}+2$

In Problems 25-35, graph each rational function

25. $f(x)=\dfrac{x}{x+4}$	26. $f(x)=\dfrac{4x-1}{x^2-9}$
27. $f(x)=\dfrac{x^2}{x^2-4}$	28. $f(x)=\dfrac{-x^2}{2x-5}$
29. $f(x)=\dfrac{2}{x^2-8x+15}$	30. $f(x)=\dfrac{1}{x^2-x-2}$
31. $f(x)=\dfrac{3x^2}{4x^2-9}$	32. $f(x)=\dfrac{x-1}{x^2-4x+3}$
33. $f(x)=\dfrac{x^3}{8x-2}$	34. $f(x)=\dfrac{x^2-7x+10}{x^2-25}$
35. $f(x)=\dfrac{5x^2-20}{x+2}$	

In Problems 36-39, a) find the slant asymptote and b) graph each rational function

36. $f(x)=\dfrac{x^2-2}{x}$	37. $f(x)=\dfrac{x^2-5x+2}{x-3}$
38. $f(x)=\dfrac{x^3-1}{x^2+3}$	39. $f(x)=\dfrac{x^2+4x-2}{x+2}$