

3.5 WS 2

KEY

Determine the vertical asymptotes of each rational function.

1. $F(x) = \frac{3x^2+5}{x^2-4}$

VA: $x = -2$; $x = 2$

2. $F(x) = \frac{4x^2+1}{2x^3-3x^2-20x}$

VA: $x = 0$, $x = 4$; $x = -\frac{5}{2}$

3. $G(x) = \frac{2x-3}{x^2+4x+5}$

VA: NONE

4. $H(x) = \frac{4x^3+1}{5x^2}$

VA: $x = 0$

Determine horizontal asymptotes of each rational function.

5. $P(x) = \frac{13x^2-8}{6x^3+2x+1}$

HA: $y = 0$

6. $H(x) = \frac{3x^3-5x^2-1}{2x^2-3x+11}$

HA: NONE

7. $F(x) = \frac{8x^2+2x+9}{\frac{2}{3}x^2+15}$

HA: $y = 12$

Determine the vertical and horizontal asymptotes of each rational function.

8. $F(x) = \frac{x+3}{1-x}$

VA: $x = 1$
HA: $y = -1$

9. $G(x) = \frac{6x^2-5}{2x^2+6}$

VA: NONE
HA: $y = 3$

10. $F(x) = \frac{5x+8}{4x^2+-8x-5}$

VA: $x = \frac{5}{2}$; $x = -\frac{1}{2}$
HA: $y = 0$

11. $P(x) = \frac{3x}{2x^2+9}$

VA: NONE
HA: $y = 0$

Find the slant asymptote of each rational function.

12. $F(x) = \frac{4x^2 + 15x + 18}{x - 5}$

$$\begin{array}{r} 4x + 35 \\ x-5 \overline{) 4x^2 + 15x + 18} \\ \underline{-4x^2 + 20x} \\ 35x + 18 \\ \underline{-35x + 175} \\ 193 \end{array}$$

SA: $y = 4x + 35$

13. $H(x) = \frac{-x^4 - 2x^3 - 3x^2 + 4x - 1}{x^3 - 1}$

$$\begin{array}{r} -x - 2 \\ x^3 - 1 \overline{) -x^4 - 2x^3 - 3x^2 + 4x - 1} \\ \underline{+x^4} \\ -2x^3 - 3x^2 + 3x - 1 \\ \underline{+2x^3} \\ -3x^2 + 3x - 3 \end{array}$$

SA: $y = -x - 2$

14. $P(x) = \frac{3 - 2x - 5x^2}{6 + x}$

SA: $y = -5x + 28$

Find all the zeros of the polynomial function and write the polynomial as a product of its leading coefficient and its linear factors.

15. $P(x) = 3x^4 - 17x^3 - 39x^2 + 337x + 116$

$x = -4, -\frac{1}{3}, 5 \pm 2i$
 $P(x) = 3(x + 4)(x + \frac{1}{3})(x - 5 + 2i)(x - 5 - 2i)$

16. $H(x) = 2x^4 - 14x^3 + 33x^2 - 46x + 40$

$x = 4, 2, \frac{1 \pm 3i}{2}$
 $P(x) = 2(x - 4)(x - 2)(x - \frac{1+3i}{2})(x - \frac{1-3i}{2})$