Honors PreCalculus Name Key ID: 1

Rational Functions - Vertical Asymptotes and Holes

Simplify each expression and identify any holes or vertical asymptotes.

1) $\frac{n^2+10n+25}{n+5}$ $\frac{(n+5)(n+5)}{(n+5)} = n+5$

VA: none

holes: $n=-5$ $(-5,0)$

2) $\frac{10}{10b-15}$ $\frac{10}{5(2b-3)}$

VA: $b=\frac{3}{2}$

holes: none

3) $\frac{15r-40}{35r+40}$ $\frac{5(3r-8)}{5(7r+8)}$

VA: $r=-8/7$

holes: none

4) $\frac{2n^2-19n+24}{5n^2-47n+56}$ $\frac{(2n-3)(n-8)}{(5n-7)(n-8)} = \frac{2n-3}{5n-7}$

VA: $n=\frac{7}{5}$

hole: $n=8$ $(8, \frac{13}{33})$

5) $\frac{7m^2+7m-14}{5m^2+16m+12} = \frac{7(m^2+m-2)}{(5m+6)(m+2)}$

$= \frac{7(m+2)(m-1)}{(5m+6)(m+2)}$

$= \frac{7(m-1)}{5m+6}$

VA: $m=-6/5$

holes: $m=-2$ $(-2, \frac{21}{4})$

6) $\frac{4p^2+20p}{7p^2+34p-5}$ $\frac{4p(p+5)}{(7p-1)(p+5)} = \frac{4p}{7p-1}$

VA: $p=1/7$

hole: $p=-5$ $(-5, \frac{5}{9})$ $\frac{-20}{-36} = \frac{5}{9}$

7) $\frac{3x^2+2x-21}{7x+21}$ $\frac{(3x-7)(x+3)}{7(x+3)} = \frac{3x-7}{7}$

VA: none

hole: $x=-3$ $(-3, -16/7)$

8) $\frac{9x^2-15x}{21x^2-18x}$ $\frac{3x(3x-5)}{3x(7x-6)} = \frac{3x-5}{7x-6}$

VA: $x=6/7$

hole: $x=0$ $(0, 5/6)$