Notes Section 2-5: Graphing Rational Equations Name_____

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

x-int none y-int $(0, -3/4)$

VA $x=4$ HA/OA $y=0$

Domain $(-\infty,4)(4,\infty)$ Range $(-\infty,0)(0,\infty)$

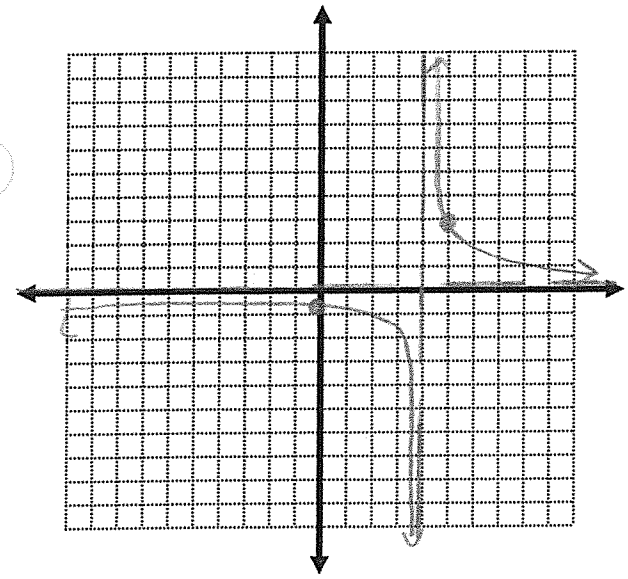
End Behavior as $x \to \infty$, $y \to 0$

as $x \to -\infty$, $y \to 0$

Behavior at each point of discontinuity

as $x \to 4^-$, $y \to -\infty$

as $x \to 4^+$, $y \to \infty$



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

x-int $(3/2, 0)$ y-int $(0, -3/2)$

VA $x=-2$ HA/OA $y=2$

Domain $(-\infty,-2)(-2,\infty)$ Range $(-\infty,2)(2,\infty)$

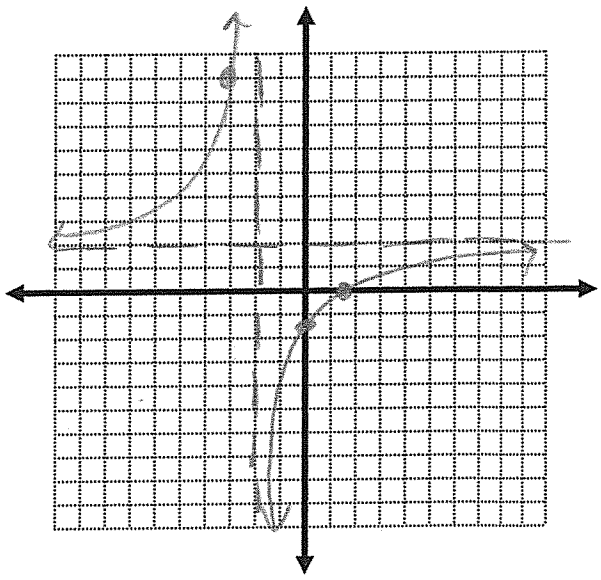
End Behavior as $x \to \infty$, $y \to 2$

as $x \to -\infty$, $y \to 2$

Behavior at each point of discontinuity

as $x \to -2^-$, $y \to \infty$

as $x \to -2^+$, $y \to -\infty$



3. $f(x) = \frac{x^2-1}{x^2-9} = \frac{(x+1)(x-1)}{(x+3)(x-3)}$

x-int $(-1,0)(1,0)$ y-int $(0, \frac{1}{9})$

VA $x = \pm 3$ HA/OA $y = 1$

Domain $(-\infty,-3)(-3,3)(3,\infty)$ Range $(-\infty, 1)(1, \infty)$

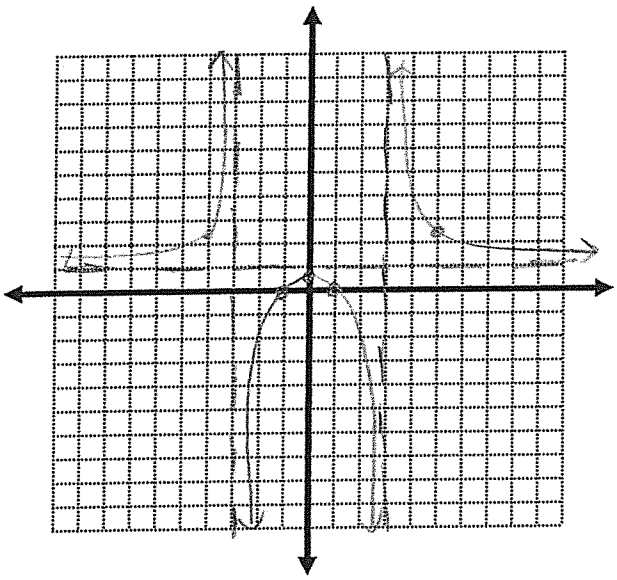
End Behavior as $x \to \infty$, $y \to 1$

as $x \to -\infty$, $y \to 1$

Behavior at each point of discontinuity

as $x \to -3^-$, $y \to \infty$ | as $x \to -3^+$, $y \to -\infty$

as $x \to 3^-$, $y \to -\infty$ | as $x \to 3^+$, $y \to \infty$



4. $f(x) = \frac{x^2-3x-28}{x^2-25} = \frac{(x-7)(x+4)}{(x+5)(x-5)}$

x-int $(7,0)(-4,0)$ y-int $(0, \frac{28}{25})$

VA $x = 5, x = -5$ HA/OA $y = 1$

Domain $(-\infty,-5)(-5,5)(5,\infty)$ Range $(-\infty, \infty)$

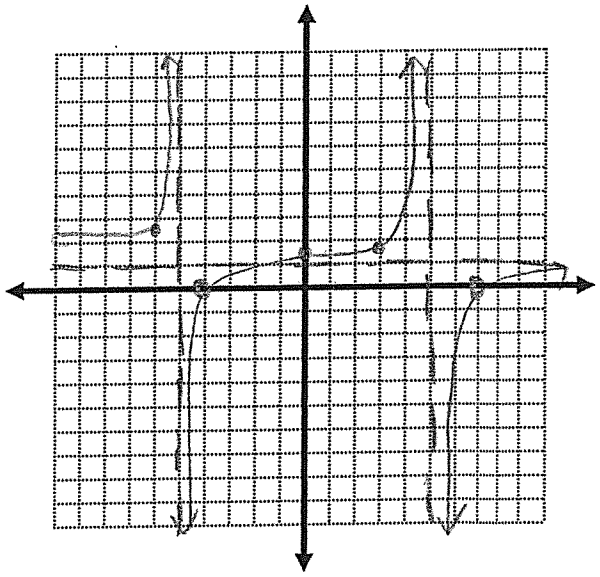
End Behavior as $x \to \infty$, $y \to 1$

as $x \to -\infty$, $y \to 1$

Behavior at each point of discontinuity

as $x \to 7^-$, $y \to \infty$ | as $x \to 7^+$, $y \to -\infty$

as $x \to -4^-$, $y \to \infty$ | as $x \to -4^+$, $y \to -\infty$



$x = -6$ $y = \frac{26}{11} = 2\frac{4}{11}$

$x = 3$ $y = \frac{-28}{-16} = \frac{7}{4} = 1\frac{3}{4}$

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

x-int none y-int (0,1)

VA $x=-1$ HA/OA $y=0$

Domain $(-\infty,-1)(-1,\infty)$ Range $(-\infty,0)(0,1/2)(1/2,\infty)$

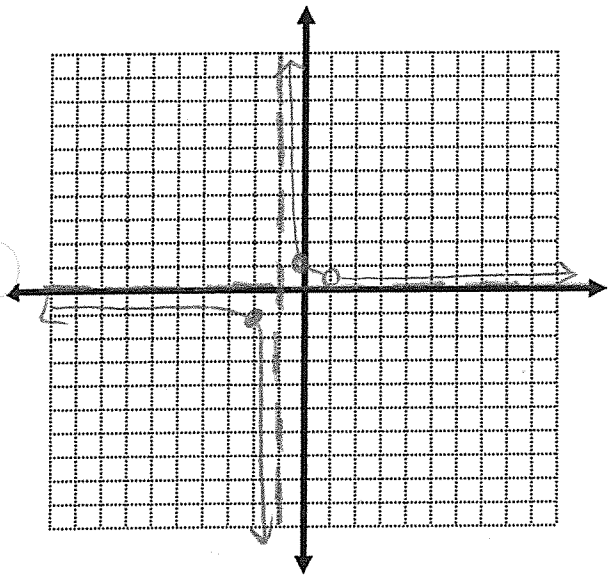
End Behavior as $x \to \infty$, $y \to 0$

as $x \to -\infty$, $y \to 0$

Behavior at each point of discontinuity

as $x \to -1^-$, $y \to -\infty$ | as $x \to -1^+$, $y \to \infty$

as $x \to 1^-$, $y \to 1/2$ | as $x \to 1^+$, $y \to 1/2$



Hole: $(1, 1/2)$

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

x-int none y-int none

VA $x=1/2$ HA/OA $y=0$

Domain $(-\infty,0)(0,1/2)(1/2,\infty)$ Range $(-\infty,-1)(-1,0)(0,\infty)$

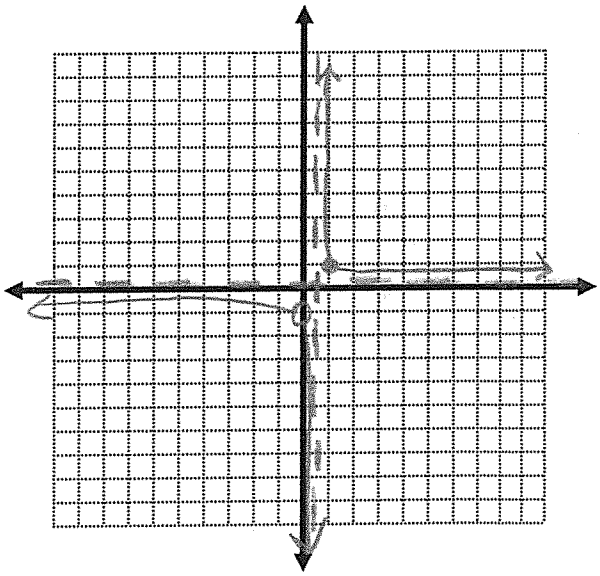
End Behavior as $x \to \infty$, $y \to 0$

as $x \to -\infty$, $y \to 0$

Behavior at each point of discontinuity

as $x \to 0^-$, $y \to -1$ | as $x \to 0^+$, $y \to -1$

as $x \to 1/2^-$, $y \to -\infty$ | as $x \to 1/2^+$, $y \to \infty$



Hole: $(0, -1)$

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

x-int (2,0) y-int (0,2)

VA $x=1$ HA/OA $y=x$

Domain $(-\infty,1)(1,\infty)$ Range $(-\infty,\infty)$

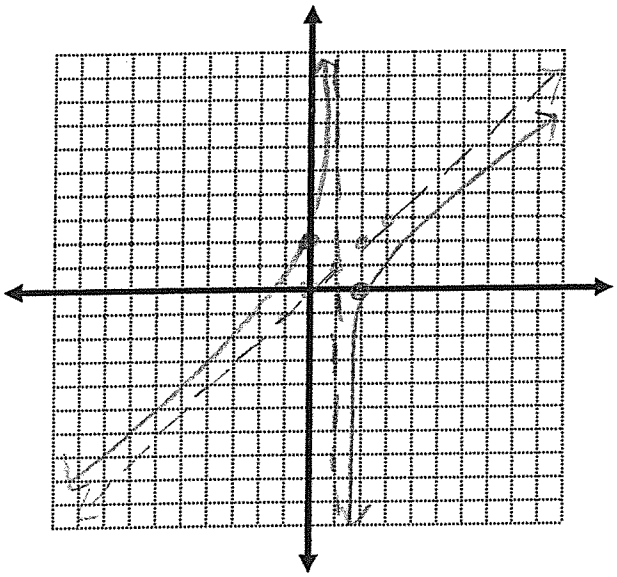
End Behavior as $x \to \infty$, $y \to \infty$

as $x \to -\infty$, $y \to -\infty$

Behavior at each point of discontinuity

as $x \to 1^-$, $y \to \infty$

as $x \to 1^+$, $y \to -\infty$



8. $f(x) = \frac{3x^2+1}{x}$

x-int none y-int none

VA $x=0$ HA/OA $y=3x$

Domain $(-\infty,0)(0,\infty)$ Range _____

End Behavior as $x \to \infty$, $y \to \infty$

as $x \to -\infty$, $y \to -\infty$

Behavior at each point of discontinuity

as $x \to 0^-$, $y \to -\infty$

as $x \to 0^+$, $y \to \infty$