Kuta Software - Infinite Algebra 2 Name Key

Graphing Rational Functions

Date _____ Period ____

Identify the points of discontinuity, holes, vertical asymptotes, x-intercepts, and horizontal asymptote of each.

1) $f(x) = \dfrac{1}{3x^2+3x-18} = \dfrac{1}{(3)(x+3)(x-2)}$

VA $x=-3$ $x=2$
Holes None
H.A. $y=0$
x int None
y int $y=-1/18$

2) $f(x) = \dfrac{x-2}{x-4}$

VA $x=4$
Holes None
HA $y=1$
x-int $x=2$
y-int $y=1/2$

3) $f(x) = \dfrac{x^3-x^2-6x}{-3x^2-3x+18} = \dfrac{x(x-3)(x+2)}{-3(x+3)(x-2)}$

VA: $x=-3$ $x=2$
Holes None
HA None
SA $y=-\frac{1}{3}x$
x-int $x=0,3,-2$
y int $y=0$

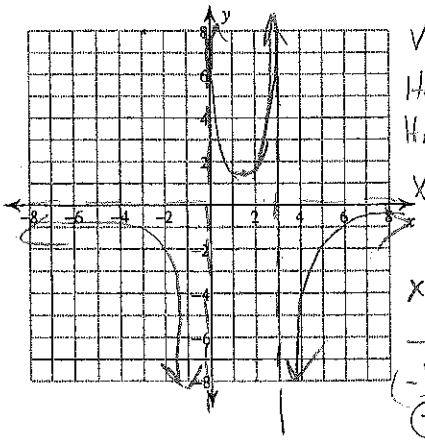
$-3x^2-3x+18 \;\overline{)\; x^3-x^2-6x}$ quotient $-\frac{1}{3}x$; $-(-x^3+x^2-6x)$; remainder 0

4) $f(x) = \dfrac{x^2+x-6}{-4x^2-16x-12} = \dfrac{(x+3)(x-2)}{-4(x^2+4x+3)} = \dfrac{(x+3)(x-2)}{-4(x+3)(x+1)}$

VA: $x=-1$
Hole $x=-3$
H.A. $y=-1/4$
x-int $x=2$
y-int $y=1/2$

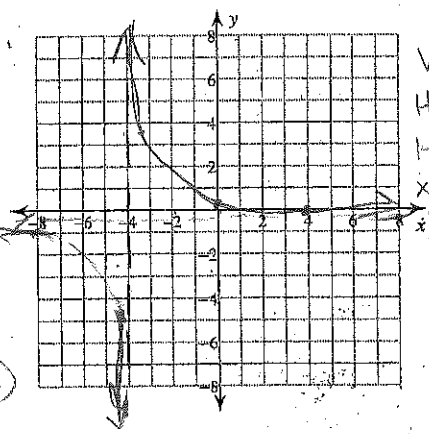
Identify the points of discontinuity, holes, vertical asymptotes, and horizontal asymptote of each. Then sketch the graph.

5) $f(x) = -\dfrac{4}{x^2-3x} = \dfrac{-4}{(x)(x-3)}$



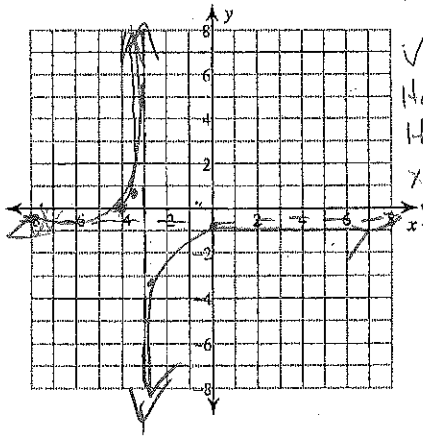
VA $x=0$ $x=3$
Holes: None
HA. $y=0$
x-int = None
y-int None
$x<0$, $0<x<3$, $x>3$
$(-)(-)$ $(+)(-)$ $(+)(+)$
$(-)$ $(+)$ $(-)$

6) $f(x) = \dfrac{x-4}{-4x-16} = \dfrac{x-4}{-4(x+4)}$



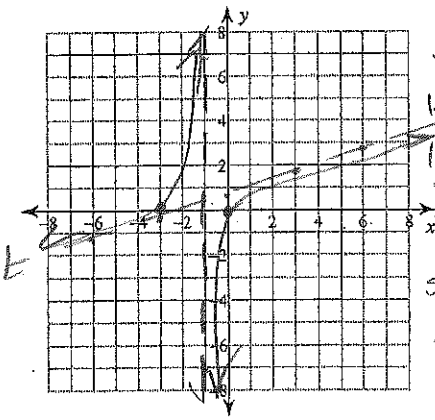
VA $x=-4$
Holes None
HA $y=-1/4$
x-int $x=4$
y-int $y=1/4$

7) $f(x) = \dfrac{x+4}{-2x-6} = \dfrac{x+4}{-2(x+3)}$



VA $x=-3$
Holes None
HA $y=-1/2$
x-int $x=-4$
y-int $y=-2/3$

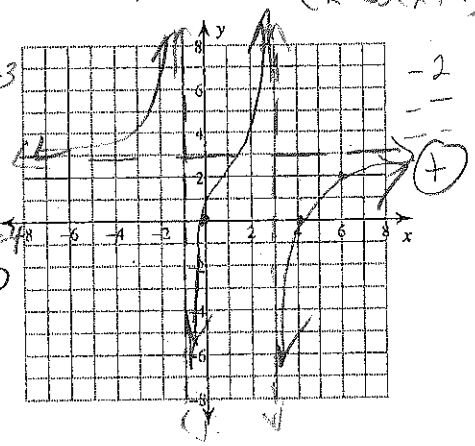
8) $f(x) = \dfrac{x^3-9x}{3x^2-6x-9} = \dfrac{x(x^2-9)}{3(x^2-2x-3)} = \dfrac{x(x-3)(x+3)}{3(x-3)(x+1)}$



VA $x=-1$
Holes $x=3$
HA None
x int $x=0$ $x=-3$
y int $y=0$
SlA, $y=\frac{1}{3}x+\frac{2}{3}$

$\frac{1}{3}x+\frac{2}{3}$
$3x^2-6x-9 \;\overline{)\; x^3-2x^2-9x}$; $-(x^3-2x^2-3x)$; $-6x-6$
$-(-2x^2-4x-6)$
$2x+6$

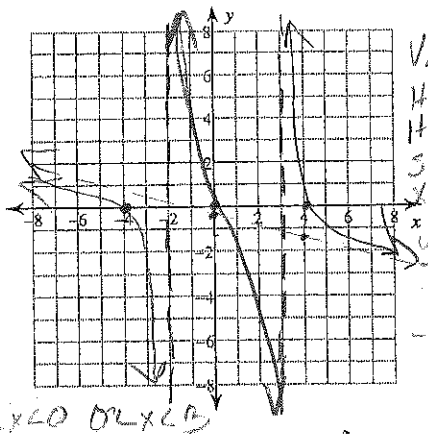
9) $f(x)=\dfrac{3x^2-12x}{x^2-2x-3}$ $\dfrac{3x(x-4)}{(x-3)(x+1)}$ =



VA $x=-1\ x=3$
H None
HA $y=3$
SA None
x-int $x=0\ x=4$
y-int $y=0$

-2 | 2
$-$ | $+$
$-$ | $+$
$+$

10) $f(x)=\dfrac{x^3-16x}{-4x^2+4x+24}$ $\dfrac{(x)(x-4)(x+4)}{-4(x-3)(x+2)}$



VA $x=3\ x=-2$
H None
HA None
SA $y=-\frac{1}{4}x-\frac{1}{4}$
x-int $x=0\ x=4\ x=-4$
y-int $y=0$

$-2<x<0$ or $x>3$

$-\frac{1}{4}x-\frac{1}{4}$

$-4x^2+4x+24\ \overline{)\ x^3+0x^2-16x+0}$

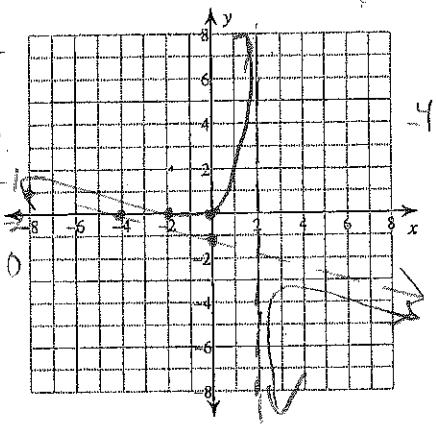
$-(x^3-x^2-6x)$

$x^2-10x+0$

$-(+x^2-x-6)$

$-9x+6$

11) $f(x)=\dfrac{x^2+2x}{-4x+8}$ $\dfrac{x(x+2)}{-4(x-2)}$



VA $x=2$
H None
HA None
SA $y=-\frac{1}{4}x-1$
x-int $x=0, -2$
y-int $y=0$

$-\frac{1}{4}x-1$

$-4x+8\ \overline{)\ x^2+2x+0}$

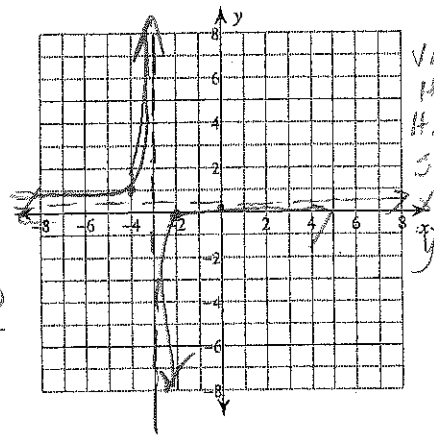
$-(x^2-2x)$

$4x+0$

$-(4x-8)$

$+8$

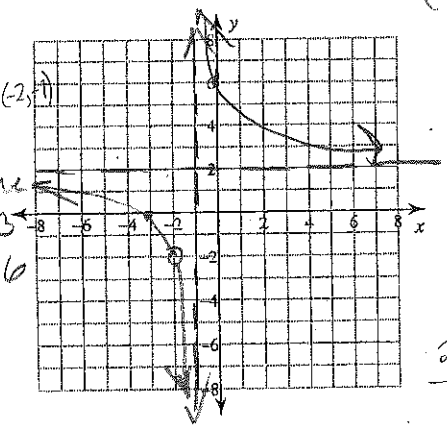
12) $f(x)=\dfrac{x+2}{2x+6}$ $\dfrac{x+2}{2(x+3)}$



VA $x=-3$
H None
HA $y=\frac{1}{2}$
SA None
x-int $x=-2$
y-int $y=\frac{1}{3}$

-2
$-$

13) $f(x)=\dfrac{2x^2+10x+12}{x^2+3x+2}$ $\dfrac{2(x+3)(x+2)}{(x+1)(x+2)}$

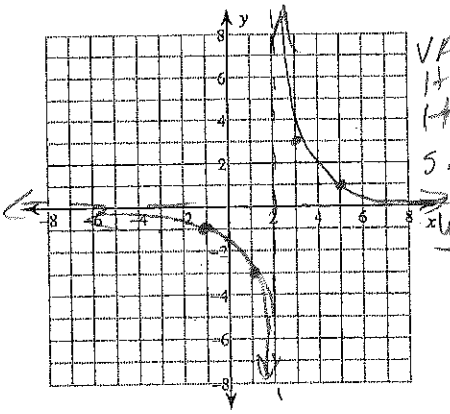


VA $x=-1$
H $x=-2$ $(-2,4)$
HA $y=2$
SA None
x-int $x=-3$
y-int $y=6$

$\dfrac{2(-2+3)}{(-2+1)}$

$\dfrac{2(1)}{-1}=\dfrac{2}{-1}=-2$

14) $f(x)=\dfrac{3}{x-2}$



VA $x=2$
H None
HA 0
SA None
x-int None
y-int $y=-3/2$