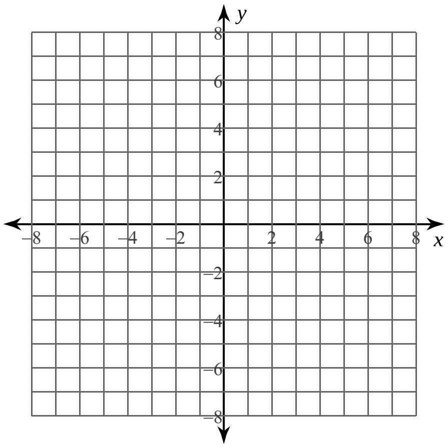
Name________________________________

Graphs of Rational Functions

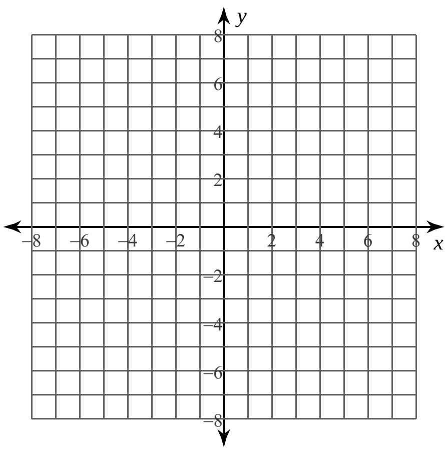
Date________________ Period____

For each function, identify the points of discontinuity, holes, intercepts, horizontal asymptote, domain, limit behavior at all vertical asymptotes, and end behavior asymptote. Then sketch the graph.

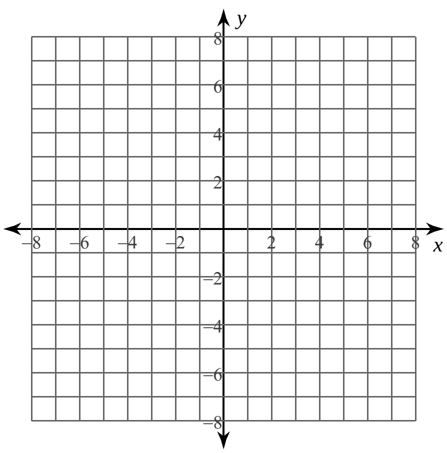
1) $f(x) = \frac{1}{x - 3} + 3$



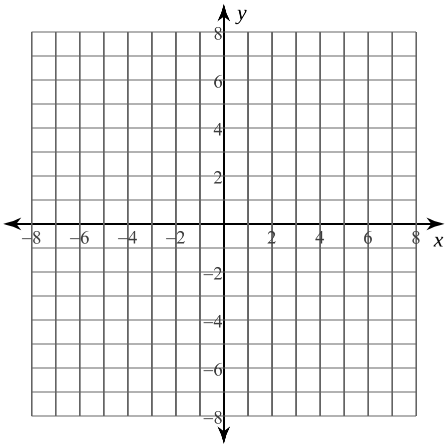
2) $f(x) = -\frac{3}{x - 2} - 2$



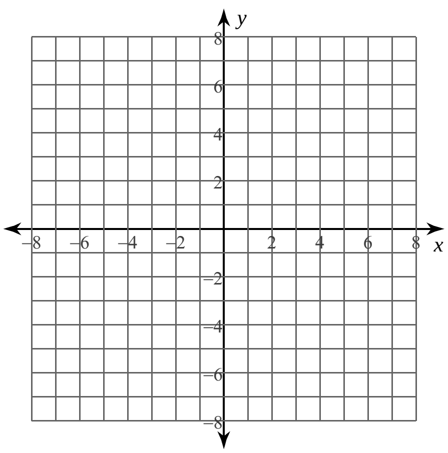
3) $f(x) = \frac{x^2 - 4}{x^2 - 9}$



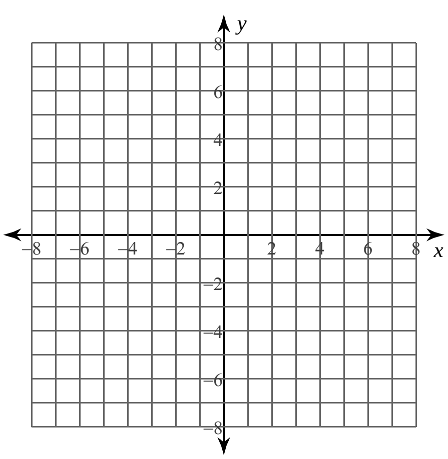
4) $f(x) = \dfrac{2x^2 - 12x + 16}{x^2 - x - 12}$



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



6) $f(x) = \dfrac{x^2 - x - 6}{x^2 - 2x - 8}$



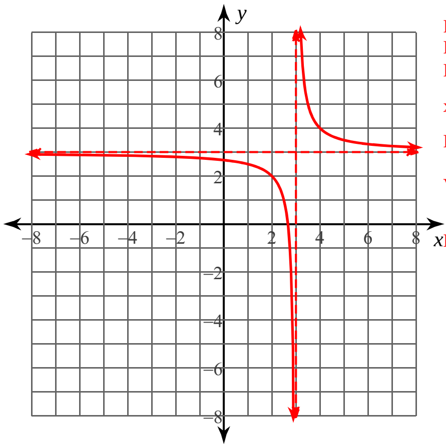
Candle Center - Infinite Precalculus   Name________________________________

Graphs of Rational Functions

Date________________ Period____

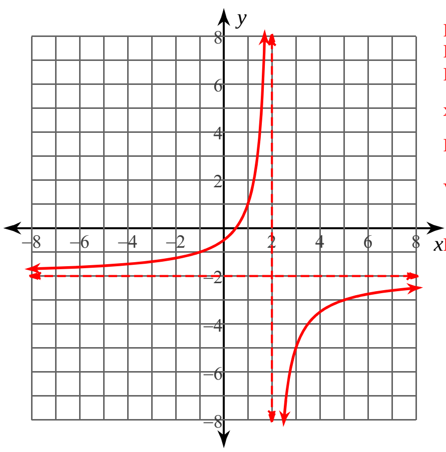
For each function, identify the points of discontinuity, holes, intercepts, horizontal asymptote, domain, limit behavior at all vertical asymptotes, and end behavior asymptote. Then sketch the graph.

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



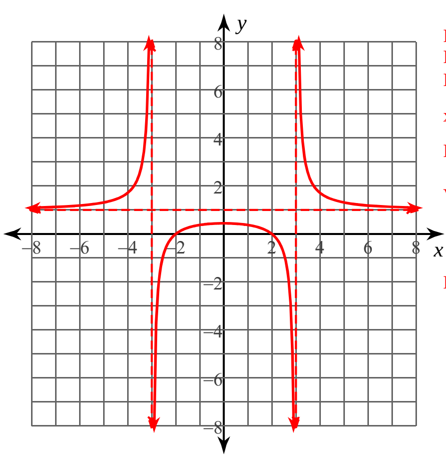
Discontinuities: 3
Holes: None
Horz. Asym.: $y = 3$
x-intercepts: $\frac{8}{3}$, y-intercept: $\frac{8}{3}$
Domain:
All reals except 3
Vert. Asym. behavior:
$\lim_{x\to 3^-} f(x) = -\infty$, $\lim_{x\to 3^+} f(x) = \infty$
End behavior asym.: $y = 3$

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



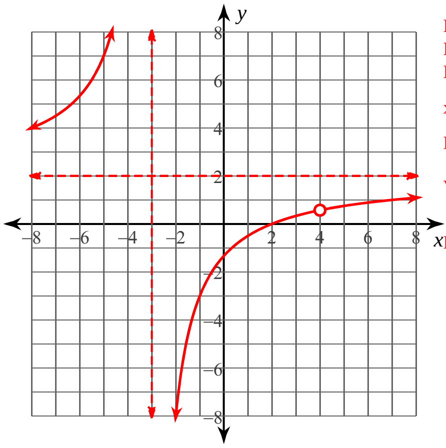
Discontinuities: 2
Holes: None
Horz. Asym.: $y = -2$
x-intercepts: $\frac{1}{2}$, y-intercept: $-\frac{1}{2}$
Domain:
All reals except 2
Vert. Asym. behavior:
$\lim_{x\to 2^-} f(x) = \infty$, $\lim_{x\to 2^+} f(x) = -\infty$
End behavior asym.: $y = -2$

3) $f(x) = \frac{x^2-4}{x^2-9}$



Discontinuities: 3, −3
Holes: None
Horz. Asym.: $y = 1$
x-intercepts: 2, −2, y-intercept: $\frac{4}{9}$
Domain:
All reals except −3, 3
Vert. Asym. behavior:
$\lim_{x\to -3^-} f(x) = \infty$, $\lim_{x\to -3^+} f(x) = -\infty$
$\lim_{x\to 3^-} f(x) = -\infty$, $\lim_{x\to 3^+} f(x) = \infty$
End behavior asym.: $y = 1$

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

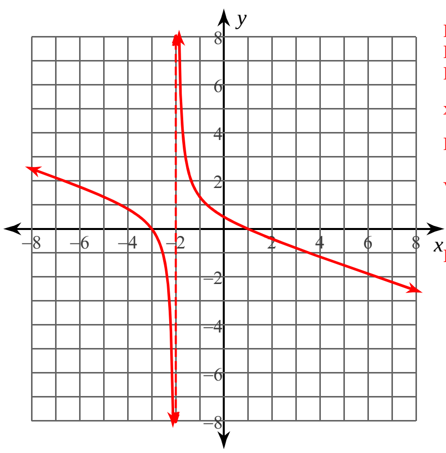


Discontinuities: $-3, 4$
Holes: $x = 4$
Horz. Asym.: $y = 2$

x-intercepts: 2, y-intercept: $-\dfrac{4}{3}$

Domain:
All reals except $-3, 4$
Vert. Asym. behavior:
$\lim_{x\to -3^-} f(x) = \infty$, $\lim_{x\to -3^+} f(x) = -\infty$
End behavior asym.: $y = 2$

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

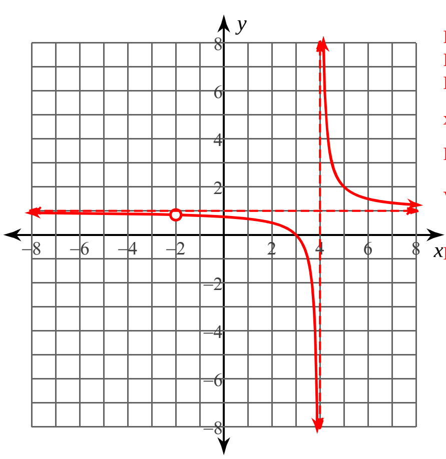


Discontinuities: -2
Holes: None
Horz. Asym.: None

x-intercepts: $1, -3$, y-intercept: $\dfrac{1}{2}$

Domain:
All reals except -2
Vert. Asym. behavior:
$\lim_{x\to -2^-} f(x) = -\infty$, $\lim_{x\to -2^+} f(x) = \infty$
End behavior asym.: $y = -\dfrac{x}{3}$

6) $f(x) = \dfrac{x^2 - x - 6}{x^2 - 2x - 8}$



Discontinuities: $4, -2$
Holes: $x = -2$
Horz. Asym.: $y = 1$

x-intercepts: 3, y-intercept: $\dfrac{3}{4}$

Domain:
All reals except $4, -2$
Vert. Asym. behavior:
$\lim_{x\to 4^-} f(x) = -\infty$, $\lim_{x\to 4^+} f(x) = \infty$
End behavior asym.: $y = 1$