

1. Consider the following functions: (a. thru d. Write your answers as $x=$ or $y=$ lines)

a) Using the following function: $F(x) = \frac{3x - 2}{x^4}$

b) State the domain: _____ (2)

c) What are the vertical asymptote(s) - if they exist _____ (2)

End Behavior Asymptote: Circle Below:

d. Type: horizontal slant other (2)
and find it. -----> Asymptote: _____ (3)

2) Using the following function: $G(x) = \frac{2x + 1}{3 - 2x}$

a) State the domain: _____ (2)

b) What are the vertical asymptote(s) - if they exist _____ (2)

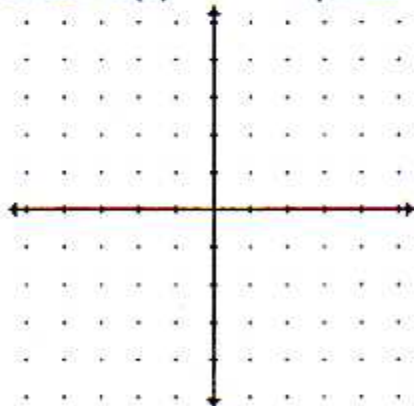
c) End Behavior Asymptote: Circle Below:

Type: horizontal slant other (2)
and find it. -----> Asymptote: _____ (3)

d) Find the x-intercept(s) of $G(x)$
(Write your answer(s) as an (x,y) coordinate point(s).) c. _____ (3)

e) Find the y-intercept of $G(x)$
(Write your answer as an (x,y) coordinate point.) d. _____ (3)

f) Sketch $G(x)$ 4 points



3. Solve algebraically - **show all work.**

a. $25x^2 - x^4 > 0$

a. _____ (4)

b. $\frac{x^3 - 9x}{x - 6} \geq 0$

b. _____ (4)

1. $P(X) = 4x^3 - 3x^2 + 4x - 3$

a. List all the rational possibilities for roots of:

___Circle Your Answer_(3)

b. Use your grapher to eliminate possibilities. List only those that make sense

c. Find all other zeros of $f(x)$.

c. _____(5)

d. Write $f(x)$ as a product of linear factors

d. _____(4)

1. Consider the following functions: (a. thru d. Write your answers as $x =$ or $y =$ lines)

a) Using the following function: $F(x) = \frac{3x - 2}{x^4}$

b) State the domain: $x^4 \neq 0$
 $x \neq 0$ $\mathbb{R}; x \neq 0$ (2)

c) What are the vertical asymptote(s) - if they exist
 $x = 0$ (2)

End Behavior Asymptote: Circle Below:

d) Type: horizontal slant other (2)
 and find it. _____ Asymptote: $y = 0$ (3)

EBM: $\frac{3x}{x^4} = \frac{3}{x^3} \rightarrow 0$ as $x \rightarrow \infty$ so \nearrow

2) Using the following function: $G(x) = \frac{2x + 1}{3 - 2x}$

a) State the domain: $3 - 2x \neq 0$
 $x \neq +3/2$ $\mathbb{R}; x \neq +3/2$ (2)

b) What are the vertical asymptote(s) - if they exist
 _____ (2)

c) End Behavior Asymptote: Circle Below:

Type: horizontal slant other (2)
 and find it. _____ Asymptote: $y = -1$ (3)

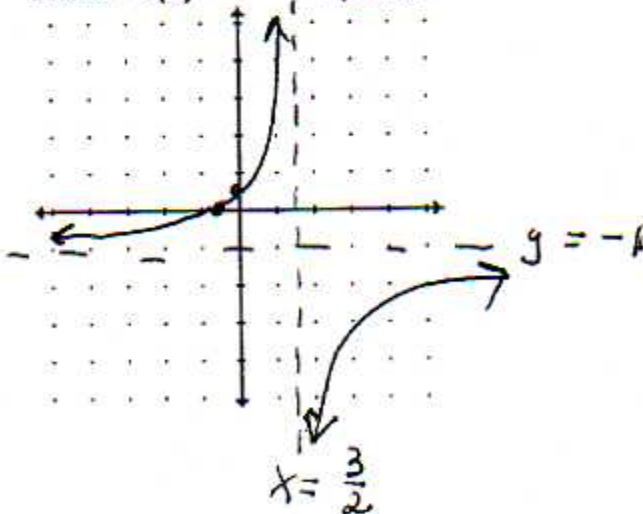
EBM: $\frac{2x}{-2x} = -1$

d) Find the x-intercept(s) of $G(x)$
 (Write your answer(s) as an (x,y) coordinate point(s).)
 $(-1/2, 0)$ (3)

e) Find the y-intercept of $G(x)$
 (Write your answer as an (x,y) coordinate point.)
 $(0, 1/3)$ (3)

$\frac{2(0) + 1}{3 - 2(0)} = \frac{1}{3}$

f) Sketch $G(x)$ 4 points



3. Solve algebraically - show all work.

a. $25x^2 - x^4 > 0$ want \uparrow

a. $(-5, 0) \cup (0, 5)$ (4)

$\Leftrightarrow 25x^2 - x^4 = 0$

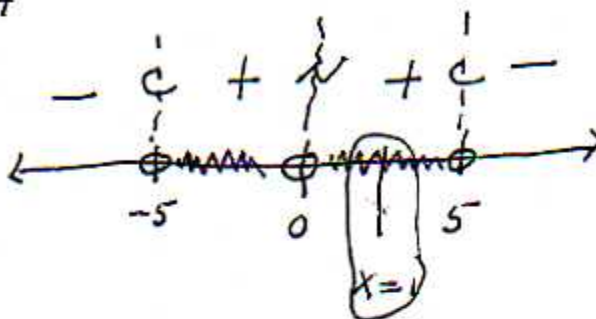
\oplus N/A

$x^2(25 - x^2) = 0$

$x^2(5-x)(5+x) = 0$

mult 2
T
mult 1
C

open dots



$25(1)^2 - 1^4 > 0$

b. $\frac{x^3 - 9x}{x - 6} \geq 0$ want \uparrow

b. $(-\infty, 3] \cup [0, 3] \cup (6, \infty)$ (4)

$\Leftrightarrow \frac{x^3 - 9x}{x - 6} = 0$

$\oplus x - 6 \neq 0$

$x \neq 6$

mult 1

change

open dots

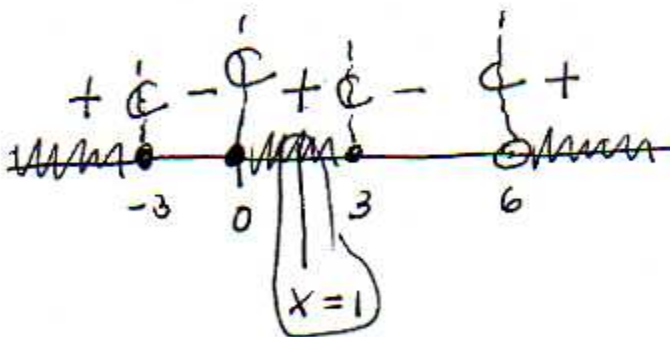
$x^3 - 9x = 0$

$x(x^2 - 9) = 0$

$x(x-3)(x+3) = 0$

mult 1
cross

solid dots



$\frac{1^3 - 9(1)}{1 - 6} = \frac{-8}{-5} > 0$

1. $P(X) = 4x^3 - 3x^2 + 4x - 3$

a. List all the rational possibilities for roots of:

Circle Your Answer (3)

$F: 4$

$B: 3$

$\pm 1, \pm 2, \pm 4$

$\pm 1, \pm 3$

$\frac{B}{F} = \frac{\pm 1, \pm 3}{\pm 1, \pm 2, \pm 4}$

$\pm 1, \pm 3, \pm \frac{1}{2}, \pm \frac{3}{2}, \pm \frac{1}{4}, \pm \frac{3}{4}$

b. Use your grapher to eliminate possibilities. List only those that make sense

$\frac{3}{4}$

c. Find all other zeros of $f(x)$.

$\frac{3}{4}, \pm i$ (5)

$$\begin{array}{r|rrrr} \frac{3}{4} & 4 & -3 & 4 & -3 \\ & \downarrow & 3 & 0 & 3 \\ \hline & 4 & 0 & 4 & 0 \end{array}$$

d. Write $f(x)$ as a product of linear factors

$4(x - \frac{3}{4})(x - i)(x + i)$ (4)

zeros:

$x = \frac{3}{4} \quad x = i \quad x = -i$

factors:

$x - \frac{3}{4} \quad x - i \quad x + i$

factorization

$(x - \frac{3}{4})(x - i)(x + i)$

need 4 for leading coefficient.

so $P(x)$ in factored form is:

$4(x - \frac{3}{4})(x - i)(x + i)$

$\hookrightarrow 4x^2 + 4 = 0$

$4x^2 = -4$

$x^2 = -1$

$x = \pm \sqrt{-1}$

$x = \pm i$