PreCalculus

Rational Functions Exploration

Desmos.com

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$f(x) = x^3 - 3x^2 + 3$

① $(-1, 0)$
$f(-1) = -1$
$f(0) = 3$
By IVT,
$f(-1) = -1 < 0 < 3 = f(0)$

② $(1, 2)$
$f(1) = 1$
$f(2) = -1$
By IVT
$f(2) = -1 < 0 < 1 = f(1)$

③ $(2, 3)$
$f(2) = -1$
$f(3) = 3$
By IVT
$f(2) = -1 < 0 < 3 = f(3)$

Feb 2-10:33 AM

(a) Given: $x^2 - 9$. Set the expression equal to zero and solve for x:

(b) Given: $x^2 + 6x + 8$. Set the expression equal to zero and solve for x:

(c) Given: $x - 1$. Set the expression equal to zero and solve for x:

On the computer/calculator: Graph part (c) divided part (a). What did you type in? y= $\frac{x-1}{x^2-9}$
Answer the following questions about the graph. Circle which piece each aspect comes from.

X-intercept(s)/Zero (write as ordered pair, please): $(1, 0)$ Numerator/Denominator (circle one)

Vertical Asymptote(s): $x = -3$, $x = 3$ (don't write just a number!) Numerator/Denominator (circle one)

Domain: $(-\infty, -3) \cup (-3, 3) \cup (3, \infty)$ Numerator/Denominator (circle one)

Horizontal Asymptote: $y = 0$. Circle the correct acronym: BOBO BOTN EATSDC

Range: $(-\infty, \infty)$

If you're using Desmos, you can type in your vertical and horizontal asymptotes to make sure you got them right.

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(a) Given: $x^2 - 9$. Set the expression equal to zero and solve for x:

$(x+4)(x+2)$
$x = -4$ $x = -2$

(b) Given: $x^2 + 6x + 8$. Set the expression equal to zero and solve for x:

(c) Given: $x - 1$. Set the expression equal to zero and solve for x:

Erase! Now graph part (b) divided by part (a). What did you type in? y= $\frac{x^2+6x+8}{x^2-9}$ $(x+3)(x-3)$
Answer the following questions about the graph. Circle what piece each aspect comes from.

X-intercept(s)/Zero (write as ordered pair, please): $(-4, 0)$ $(-2, 0)$ Numerator/Denominator (circle one)

Vertical Asymptote(s): $x = -3$ $x = 3$ (don't write just a number!) Numerator/Denominator (circle one)

Domain: $(-\infty, -3) \cup (-3, 3) \cup (3, \infty)$ Numerator/Denominator (circle one)

Horizontal Asymptote: $y = 1$. Circle the correct acronym: BOBO BOTN EATSDC

Range: $(-\infty, \infty)$

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(a) Given: $x^2 - 9$. Set the expression equal to zero and solve for x:

(b) Given: $x^2 + 6x + 8$. Set the expression equal to zero and solve for x:

(c) Given: $x - 1$. Set the expression equal to zero and solve for x:

$$\frac{x^2-9}{x-1}$$

Answer the following questions about the graph. Circle what piece each aspect comes from.

X-intercept(s)/Zero (write as ordered pair, please): (-3,0)(3,0) Numerator/Denominator (circle one)

Vertical Asymptote(s): x = 1 (don't give me just a number!) Numerator/Denominator (circle one)

Domain: x ≠ 1 (-∞,1)∪(1,∞) Numerator/Denominator (circle one)

Horizontal Asymptote: none Circle the correct acronym: BOBO BOTN EATSDC

Range: (-∞,∞)

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