Quiz 5

Math 3C: Precalculus

November 7, 2019

When you finish, please remain seated until class is dismissed

Name: **Solutions**   PID: _____

Problem 1 (8 points). Let

$$h(a) = \frac{(x-2)(x+1)}{(x-3)(x-2)(x+3)^2}$$

← I should replace "x" with "a" — this was a typo

(a) What are the vertical asymptotes of $h(a)$?

Denominator zero, numerator nonzero.

$(x-3)(x-2)(x+3)^2 = 0 \longrightarrow x = 3, 2,$ or -3.

But $x=2$ makes numerator zero $\longrightarrow$ not an asympote.

Answer: $\boxed{x=3}$ and $\boxed{x=-3}$ are asymptotes (vertical)

(b) What are the horizontal asymptotes of $h(a)$?

Degree of numerator is less than degree of denominator, so horizontal asymptote is at $\underline{y=0}$.

(c) Does $h(a)$ have any holes? If so, where?

Yes. $x=2$ makes both numerator and denominator equal zero, so there is a hole at $x=2$.
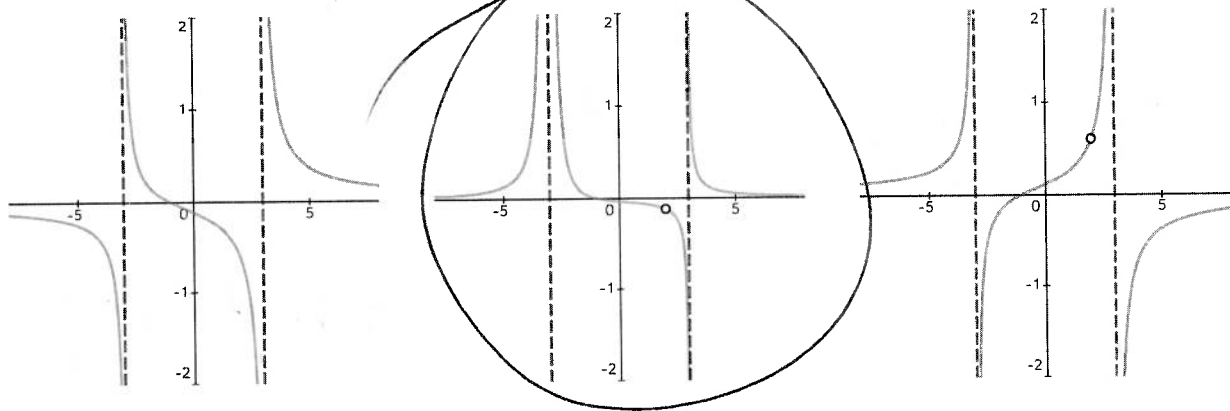
To find vertical coordinate:

$$\frac{\cancel{(x-2)}(x+1)}{(x-3)\cancel{(x-2)}(x+3)^2} = \frac{x+1}{(x-3)(x+3)^2} \longrightarrow \frac{2+1}{(2-3)(2+3)^2} = \frac{3}{-1 \cdot 25} = \frac{-3}{25}$$

Plug in $x=2$

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Hole at $\boxed{(2, \frac{-3}{25})}$

(d) Which of the following graphs could potentially be the graph of $h(a)$? *circle one*

Problem 2 (2 points). Suppose you have an investment account with $3000 in it that generates interest. If the interest rate is 10% compounded annually, what is the amount of money in the account after 1 year?

10% interest per year.

10% of 3000 is

0.1·3000 = 300

After 1 year, balance is

3000 + 300 = 3300.

↗ balance at start of year

↑ interest

10% increase each year means balance is multiplied by 1.1 each year.

3000·1.1 = 3300.

2

↖ ↗

Two example Methods