

READ AND FOLLOW ALL DIRECTIONS. CIRCLE YOUR FINAL ANSWERS.
SHOW ALL WORK TO RECEIVE FULL CREDIT. NO CALCULATORS.

1. (5 points) Let $F(x) = \frac{5x^2}{5-x}$

(a) Identify the domain of $F(x)$.

$\text{dom } F = \{x \mid x \neq 5\}$ since $5-x=0 \Rightarrow x=5$

(b) Circle the correct option:

$F(x)$ (is) is not in lowest terms.

$F(x)$ is a (proper) (improper) rational function.

(c) List the vertical asymptote(s) of $F(x)$.

~~$x=5$~~ $x=5$

2. (5 points) Let $G(x) = \frac{6}{(x+3)(4-x)}$

(a) Identify the domain of $G(x)$.

$\text{dom } G = \{x \mid x \neq -3, x \neq 4\}$

(b) Circle the correct option:

$G(x)$ (is) / is not in lowest terms.

$G(x)$ is a (proper) / improper rational function.

(c) List the horizontal asymptote(s) of $G(x)$.

$y=0$

Quiz #7

3. (10 points) Let $H(x) = \frac{x^3}{x^2-5x+6} = \frac{x^3}{(x-3)(x-2)}$

(a) Identify the domain of $H(x)$.

$$\text{dom } H = \{x \mid x \neq 3, x \neq 2\}$$

(b) Circle the correct option:

$H(x)$ (is) / is not) in lowest terms.

$H(x)$ is a (proper (improper)) rational function.

(c) Determine the horizontal and/or oblique asymptote(s) of $H(x)$. Be sure to show your work. (Hint: You *will* need polynomial long division or synthetic division.)

~~$$\frac{x^3}{x^2-5x+6}$$~~

$$\begin{array}{r} x+5 \\ \hline x^3 \\ -(x^3-5x^2+6x) \\ \hline 5x^2-6x \\ -(5x^2-25x+30) \\ \hline 19x-30 \end{array}$$

$$H(x) = \frac{x^3}{x^2-5x+6} = x+5 + \frac{19x-30}{x^2-5x+6}$$

As $x \rightarrow \infty$, $H(x) \rightarrow x+5$

$y = x+5$ is a horizontal asymptote of $H(x)$.

4. (2 points) EXTRA CREDIT. List the possible rational zeros of the polynomial $f(x) = 2x^6 + 3x^5 + 5x^4 + 7x^3 + 11x^2 + x + 13$.

$$p: \pm 13, \pm 1$$

$$q: \pm 2, \pm 1$$

$$\frac{p}{q}: \pm 1, \pm 13, \pm \frac{1}{2}, \pm \frac{13}{2}$$