AP Precalculus – Mixed Six – Unit 1 Review

Calculator

Three functions *f*, *g*, and *h* are introduced in #1, #2, and #3. Use these functions for #4, #5, and #6. Round your answers to three places after the decimal.

1. Factual Recall

The polynomial function *f* is given by

$f(x) = x(x^2 - x - 2)$.

Find each of the following:

a) the zeros of *f*

b) the value of the function when $x = 2.5$

c) The value of *x* when $f(x) = 2.5$

d) Determine the end behavior of *f* and express your answer as a limit.

2. Carry out a Procedure

x	–2	–1	0	1	2
$g(x)$	–8	–5	2	7	10

Let *g* be an increasing function defined for all real numbers. The table above gives values of *g* for selected values of *x*.

a) Use the table of values of $g(x)$ to determine a linear model.

b) Use your model to approximate a value for $g(0.5)$.

3. Classify a Mathematical Object

True-False

The rational function *h* is given by

$$h(x) = \frac{x^3 + 4x^2 - 3}{x^2 - 1}.$$

T/F	Statement
	$\lim_{x \to \infty} h(x) = -\infty$
	$\lim_{x \to -\infty} h(x) = -\infty$
	The graph of *h* has two vertical asymptotes.
	The graph of *h* has a hole and one vertical asymptote.

4. Prove, Show, Justify

The rational function *h* has a slant asymptote. Find the slant asymptote. Show the work that leads to your answer. Graph the function and the slant asymptote on your calculator to verify.

5. Extend a Concept

For the polynomial function *f* and the rational function *h* find the points of intersection.

For what values *x* are the values of both the polynomial function *f* and the function *g* less than –8? That is, find the values of *x* that satisfy $f(x) < -8$ and $g(x) < -8$.

6. Critique a Fallacy

Suppose *j* is a new function defined by $j(x) = \frac{f(x)}{x+1}$. Sam says that *j* will have a vertical asymptote of $x = -1$. Is Sam correct? If not, please correct his response.

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