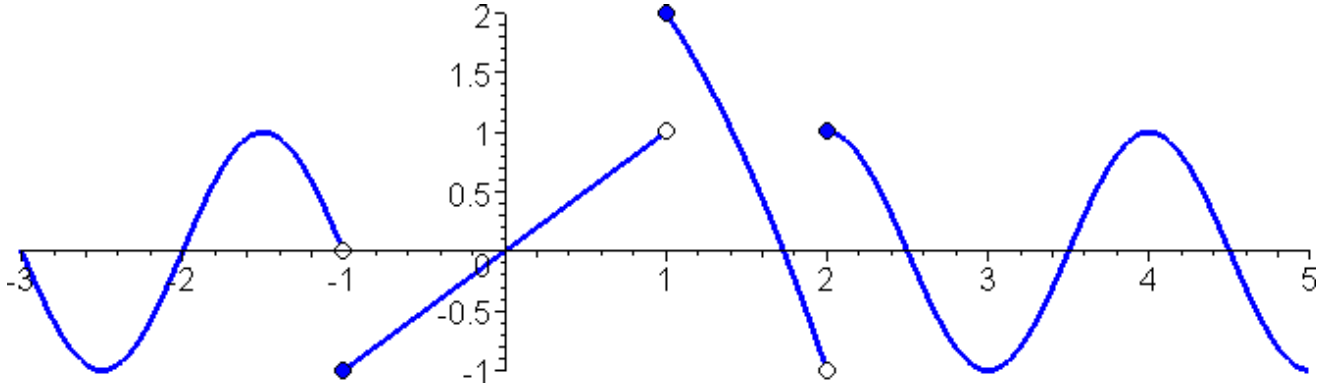
Name KEY Date 10/17/2017 Period 18 pts

PreAP Precalculus

TEST Chapter 2.1-2.3, Form A. No Calculator

Part I: Multiple Choice, Put your **CAPITAL LETTER** answer choice in the blank to the left of the number.

Use the graph of $f(x)$ below for $-4 \le x \le 4$ to answer questions 1- 5.



A 1. $\lim_{x \to 2^-} f(x) =$

(A) -1 (B) 0 (C) 1 (D) 2 (E) DNE

D 2. $f(x)$ is monotonic/strictly decreasing on which of the following given intervals?

(A) $(-3,-2)$ (B) $(-1,1)$ (C) $(3,5)$ (D) $(1,2)$ (E) $(2,4)$

A 3. $\lim_{x \to 3} f(x) =$

(A) -1 (B) 0 (C) 2 (D) DNE (E) $-\infty$

C 4. Which of the following is true about the graph of $f(x)$?

(A) $f(x)$ has a local min at $x = 2$ (B) $f(x)$ has a local max of 4 (C) $f(x)$ has a local max at $x = 1$

(D) $f(x)$ has a global/absolute max of 1 (E) $f(x)$ has no relative/local minimum

D 5. Which of the following is **NOT** true about the graph of $f(x)$?

(A) $f(x)$ is continuous at $x = 0$ (B) $\lim_{x \to 2^-} f(x) = f(-1)$ (C) $\lim_{x \to 3} f(x) = -1$

(D) $\lim_{x \to -1^-} f(x) = \lim_{x \to 2^-} f(x)$ (E) $f(x)$ has an absolute max at 1.

C 6. If $h(x)=x^2-2x-15$, find the average rate of change of $h(x)$ on the interval $x\in[-2,4]$.

(A) $-\frac{7}{2}$ (B) $-\frac{14}{6}$ (C) 0 (D) $-\frac{1}{2}$ (E) DNE

$$\text{Avg} = \frac{h(4)-h(-2)}{4+2}$$
$$= \frac{(16-8-15)-(4+4-15)}{6}$$
$$= \frac{-7+7}{6} = \frac{0}{6} = 0$$

D 7. Which of the following **is true** about $f(x)=\dfrac{2x^2-5x-3}{x^2+x-12} = \dfrac{(2x+1)(x-3)}{(x+4)(x-3)}$

hole at (3,1)

(A) $f(x)$ has a vertical asymptote at $x=3$ (B) $f(x)$ has a vertical asymptote at $x=-\frac{1}{2}$

(C) $\lim\limits_{x\to-\infty} f(x)=\infty$ (D) $f(x)$ has a hole at $(3,1)$ (E) $f(x)$ has horizontal asymptote at $y=0$

C 8. $\lim\limits_{x\to\infty}\dfrac{22x^2+55x}{x^\pi} = 0$ $\pi > 2$

(A) 22 (B) π (C) 0 (D) $-\infty$ (E) ∞

A 9. The function $f(x)=\begin{cases}3x-2, & x<1\\ 2x^2-8, & x>1\end{cases}$

(A) has a jump at $x=1$ (B) has a hole at $x=1$ (C) has a VA at $x=1$
(D) is continuous at $x=1$ (E) is an even function

$$\lim_{x\to1^-} f(x) = 1$$
$$f(1) = \text{DNE}$$
$$\lim_{x\to1^+} f(x) = -6$$

Part II: Free Response

Show all work in the space provided. As always, use proper notation, and show the work that leads to your answer. Remember that on this section, your PROCESS is as important as your PRODUCT. Given

$f(x)=3x^2+6x-45$ $\quad g(x)=x^2+3x-10$ $\quad k(x)=5x^{10}-8x^8-2x^4-2$ $\quad p(x)=9x^8-3x^4+6$

10. Let $h(x)=\dfrac{g(x)}{f(x)}$

(a) Find the domain of $h(x)$.

$$h(x)=\frac{x^2+3x-10}{3x^2+6x-45}=\frac{(x+5)(x-2)}{3(x^2+2x-15)}=\frac{(x+5)(x-2)}{3(x+5)(x-3)}$$

$D_h:\{x \mid x\neq -5, x\neq 3\}$ √1

(b) Find the **equation** of any vertical asymptote of $h(x)$.

VA @ $x=3$ √2

(c) Find the **coordinate**, (x, y), of any removable point discontinuity of $h(x)$.

hole @ $\left(-5, \frac{-7}{3(-8)}\right)=\left(-5, \frac{7}{24}\right)$ √3 √4

$h(x)=\dfrac{x-2}{3(x-3)}, x\neq -5$

(d) Find the **equation** of any horizontal asymptote of $h(x)$.

$\lim_{x\to\infty} h(x)=\lim_{x\to-\infty} h(x)=\frac{1}{3}$

HA @ $y=\frac{1}{3}$ √5

(e) Find the **coordinate**, (x, y), of any x-intercepts of $h(x)$.

$h(x)=0$

when $x-2=0$

$x=2$

So, x-int @ $(2,0)$ √6

11. Let $m(x)=\dfrac{k(x)}{p(x)}$

(a) Is $m(x)$ is even, odd, or neither. Justify.

$$m(x) = \frac{5x^{10}-8x^{8}-2x^{4}-2}{9x^{8}-3x^{4}+6}$$

Justify

$m(-x)=m(x)$ or $\frac{E}{E}=E$

So, $m(x)$ is EVEN $\sqrt{7}$

(with some justification)

(b) Find $\lim\limits_{x\to -\infty} m(x)$

$$m(x) = \frac{5x^{10}-8x^{8}-2x^{4}-2}{9x^{8}-3x^{4}+6}$$

$\lim\limits_{x\to -\infty} m(x) = \infty$ $\sqrt{8}$

or DNE

(c) Find the y-intercept of $m(x)$. List it as an ordered pair.

$$m(x) = \frac{5x^{10}-8x^{8}-2x^{4}-2}{9x^{8}-3x^{4}+6}$$

$m(0) = \frac{-2}{6} = -\frac{1}{3}$

So, y-int @ $\left(0,-\frac{1}{3}\right)$ $\sqrt{9}$

9 points on F.R.