Name_____ Date_____ Period_____

PreAP Precalculus TEST 1: 1.1-1.2—Prerequisites and properties of functions

NO CALCULATOR

Part I: Multiple Choice

You may do all work for the multiple choice section on scratch paper or below each problem. Attach all scratch work to the back of this test when you turn it in. Write the **CAPITAL LETTER** of the correct response in the blank to the left of the question number.

_____ 1. Simplify by eliminating the complex fraction: $\dfrac{\dfrac{2x}{y^2}+\dfrac{3y}{x^2}}{3-\dfrac{1}{x}}$

(A) $\dfrac{2x+3y}{3y^2-x}$ (B) $\dfrac{2x^2+3xy}{3x^2y^2}$ (C) $\dfrac{2x^3+3y^3}{3x^2y^2-xy^2}$ (D) $\dfrac{3x^2y+2xy^2}{3+x}$ (E) $\dfrac{2x\sqrt{y}+3\sqrt{x}y}{3+x}$

_____ 2. Simplify the following expression: $\left(\dfrac{4x^2y^{-3}}{\sqrt{xy}}\right)^{-2}$

(A) $\dfrac{y^8}{8x^3}$ (B) $\dfrac{y^8}{16x^3}$ (C) $\dfrac{y^2}{16x^3}$ (D) $\dfrac{y^8}{4x^3}$ (E) $\dfrac{y^2}{4x^3}$

_____ 3. Simplify the following: $\dfrac{\sqrt[3]{5}\cdot\sqrt[3]{50}}{\sqrt[3]{2}}$

(A) $\sqrt[3]{25}$ (B) 25   (C) 125   (D) 5   (E) $\sqrt[3]{10}$

_____ 4. Expand the following: $\left(3x^3-x\right)\left(\sqrt[3]{x}+\dfrac{2}{x^2}\right)$

(A) $3\sqrt[3]{x}+6x-\sqrt[3]{x}-2x^{-1}$ (B) $3\sqrt[3]{x}+6x-\sqrt[3]{x^4}+2x$ (C) $\dfrac{3\sqrt[3]{x^{10}}+6x-\sqrt[3]{x^4}+2}{x}$ (D) $3\sqrt[3]{x^{10}}+6x-\sqrt[3]{x^4}-\dfrac{2}{x}$

_____ 5. Rationalize and simplify: $\dfrac{\sqrt{x}+2}{x^2-4x}$.

(A) $\dfrac{1}{x^{3/2}-2}$ (B) $\dfrac{1}{x^{3/2}-2x}$ (C) $\dfrac{x+4}{x^2-4x}$ (D) $\dfrac{2}{x-4}$ (E) $\dfrac{x^2-4x}{\sqrt{x}+2}$

_____ 6. Simplify: $3\sqrt[4]{32}+\dfrac{5}{(162)^{-1/4}}$

(A) $8\sqrt[4]{2}$ (B) $21\sqrt[4]{2}$ (C) $15\sqrt[4]{2}$ (D) $-9\sqrt[4]{2}$ (E) $29\sqrt[4]{2}$

_____ 7. Which of the following is the solution to $12x^2+5x-3\geq 0$?

(A) $\left[-\dfrac{3}{4},\dfrac{1}{3}\right]$ (B) $\left(-\infty,-\dfrac{3}{4}\right]\cup\left[\dfrac{1}{3},\infty\right)$ (C) $\left(-\infty,-\dfrac{3}{4}\right)\cup\left(\dfrac{1}{3},\infty\right)$ (D) $\left(-\dfrac{3}{4},\dfrac{1}{3}\right)$ (E) all real numbers

_____ 8. If $f(x)=3x^2-2x+1$ and $g(x)=3x-1$, what is $(f\circ g)(x)$?

(A) $27x^2-24x+6$ (B) $9x^2-6x+2$ (C) $27x^2-6x+6$ (D) $3x^2+x$ (E) $27x^2-24x+3$

Part II: Free Response

Show all work in a logical, vertical sequence and use proper notation. Box your final answers.
Work each problem in the box provided for that answer.

9. For the following functions $f(x) = -2x + 3$, $g(x) = \sqrt{3 - 7x}$, $h(x) = 5x^2 - 2x$ answer the following questions.

(a) Find the domain of $g(x)$ by setting up and <u>solving an inequality</u>. Show the work that leads to your answer. Give your answer in either set or interval notation.

(b) Solve the inequality $h(x) < 0$ <u>graphically</u>. Be sure to find your x-intercepts and show your graph. Give your answer in either set or interval notation.

(c) Evaluate and simplify $f\left(h(x)\right)$ by combining like terms and writing the terms in descending order of degree.

(d) Evaluate and simplify $\dfrac{h(x+z)-h(x)}{z}$ (There should be no "z" in the denominator at the end.)