

## PreAP Precalculus

## TEST Chapter 2.1-2.5, Form A. No Calculator

## Part I: Multiple Choice

Put your CAPITAL LETTER answer choice in the blank to the left of the number.

\_\_\_\_\_ 1. In the function  $g(x) = \frac{1}{3x+2}$ , the 3 horizontally compresses the graph of  $f(x) = \frac{1}{x + \frac{2}{3}}$  by a factor

of 3. This is equivalent to what other transformation on the graph of  $f$  to produce the graph of  $g$ ?

(A) Vertical stretch bfo 3 (B) Horizontal stretch bfo 3 (C) Vertical compressions bfo 3

(D) Vertical compression bfo  $\frac{3}{2}$  (E) Vertical stretch bfo  $\frac{3}{2}$

\_\_\_\_\_ 2. If  $g(x) = 5\sqrt{\frac{1}{2} - 2x}$ ,  $h(x) = 4 - 4x$ , and  $j(x) = 5 + 5x$ , what is the domain of  $p(x) = \frac{g(x)}{(h \circ j)(x)}$

(A)  $\left\{x \mid x \geq -\frac{1}{4}, x \neq \frac{4}{5}\right\}$  (B)  $\left\{x \mid x \leq -1, x \neq \frac{5}{4}\right\}$  (C)  $\left\{x \mid x \leq 1, x \neq \frac{4}{5}\right\}$

(D)  $\left\{x \mid x \leq \frac{1}{4}, x \neq -\frac{4}{5}\right\}$  (E)  $\left\{x \mid x \geq \frac{1}{4}, x \neq \frac{5}{4}\right\}$

\_\_\_\_\_ 3. If  $Q(x) = \frac{3}{4x-1}$ , find two functions,  $f$  and  $g$ , such that  $h(x) = f(g(x))$ .

(A)  $g(x) = 4x, f(x) = \frac{3}{x}$  (B)  $g(x) = \frac{3}{4}x, f(x) = \frac{1}{x-1}$

(C)  $g(x) = 4x-1, f(x) = \frac{3}{x}$  (D)  $g(x) = 4x-1, f(x) = 3x$  (E)  $g(x) = \frac{3}{x}, f(x) = \frac{4}{3}x-1$

\_\_\_\_\_ 4. If  $f(g(x)) = x = g(f(x))$  and if  $g(x) = \frac{-3x+2}{7x+5}$ , then the range of  $f(x)$  is

(A)  $\left(-\infty, -\frac{3}{7}\right) \cup \left(-\frac{3}{7}, \infty\right)$  (B)  $\left(-\infty, -\frac{5}{7}\right) \cup \left(-\frac{5}{7}, \infty\right)$  (C)  $\left(-\infty, \frac{2}{5}\right) \cup \left(\frac{2}{5}, \infty\right)$  (D)  $\left(-\infty, \frac{2}{3}\right) \cup \left(\frac{2}{3}, \infty\right)$  (E)  $\mathbb{R}$

- \_\_\_\_\_ 5. If  $f(x) = -4e^x + 5$ , what is the range of  $g(x) = |f(x)|$ ?
- (A)  $(5, \infty)$       (B)  $(-\infty, 5)$       (C)  $[0, \infty)$       (D)  $(-\infty, 0]$       (E)  $(-\infty, 1]$

- \_\_\_\_\_ 6. If  $f(x) = 3 - \ln(2 + 5x)$ , what is the domain of  $f(x)$ ?
- (A)  $\left\{x \mid x < \frac{2}{5}\right\}$       (B)  $\left\{x \mid x \leq \frac{2}{5}\right\}$       (C)  $\left\{x \mid x < -\frac{2}{5}\right\}$       (D)  $\left\{x \mid x \geq -\frac{2}{5}\right\}$       (E)  $\left\{x \mid x > -\frac{2}{5}\right\}$

- \_\_\_\_\_ 7. If  $f(x) = \sqrt{2x+1}$  and  $g(x) = \frac{3}{x-5}$ , what is the domain of  $h(x) = (g \circ f)(x)$ ?
- (A)  $\left[-\frac{1}{2}, 12\right) \cup (12, \infty)$       (B)  $\left[-\frac{1}{2}, \infty\right)$       (C)  $\left(-\frac{1}{2}, 12\right) \cup (12, \infty)$       (D)  $\left(-\frac{1}{2}, \infty\right)$       (E)  $\left[-\frac{1}{2}, 5\right) \cup (5, \infty)$

- \_\_\_\_\_ 8. Find the range of  $f(x) = -3e^{4x-2} + 5$
- (A)  $(-\infty, 3)$       (B)  $\left(-\infty, \frac{1}{2}\right)$       (C)  $\left(\frac{1}{2}, \infty\right)$       (D)  $(-\infty, 5)$       (E)  $(5, \infty)$

Part II: Free Response

Show all work in the space provided. **Use proper notation**, and box your final answers. Remember that on this section, your **PROCESS** is as important as your **PRODUCT**. **BE SURE TO NAME EACH OF YOUR FUNCTIONS**.

9. For  $f(x) = \frac{8}{3} + \frac{4}{5}e^{\left(2 - \frac{2}{7}x\right)}$

(a) Write  $f(x)$  as an **equation** in standard transformation form.

(b) Using your answer from part (a), describe the proper sequence of transformations on the parent function to obtain the graph of  $f(x)$ .

(c) Find the **simplified, exact value** of the  $y$ -intercept (your answer will have a visible  $e$  in it.) Show the work that leads to your answer.

(d) Sketch  $f(x)$  showing the basic shape, location,  $y$ -intercept, and any/all asymptotes.

(e) Find  $D_f$  :

(f) Find  $R_f$  :

(g) Find the **equation(s)** of any/all asymptotes. Be sure to label which type each is (Horizontal or Vertical).

(h)  $\lim_{x \rightarrow \infty} f(x) =$