

## PreAP Precalculus

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

## Part I: Multiple Choice

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

\_\_\_\_\_ 1. Find the range of  $f(x) = 3e^{4+5x} - 3$

- (A)
- $(-\infty, -3)$
- (B)
- $[-3, \infty)$
- (C)
- $(-\infty, -3]$
- (D)
- $(3, \infty)$
- (E)
- $(-3, \infty)$

\_\_\_\_\_ 2. If  $f(x) = \frac{2}{2x-1}$  and  $g(x) = \sqrt{x-1}$ , what is the domain of  $h(x) = (f \circ g)(x)$ ?

- (A)
- $\left[1, \frac{5}{4}\right) \cup \left(\frac{5}{4}, \infty\right)$
- (B)
- $[1, \infty)$
- (C)
- $\left(1, \frac{5}{4}\right) \cup \left(\frac{5}{4}, \infty\right)$
- (D)
- $(1, \infty)$
- (E)
- $\left[-1, \frac{5}{4}\right) \cup \left(\frac{5}{4}, \infty\right)$

\_\_\_\_\_ 3. If  $f(x) = 3 + \frac{2}{3} \ln\left(\frac{3}{4} - \frac{4}{5}x\right)$ , what is the domain of  $f(x)$ ?

- (A)
- $\left\{x \mid x < \frac{15}{16}\right\}$
- (B)
- $\left\{x \mid x < \frac{16}{15}\right\}$
- (C)
- $\left\{x \mid x < -\frac{3}{4}\right\}$
- (D)
- $\left\{x \mid x > -\frac{3}{4}\right\}$
- (E)
- $\left\{x \mid x > \frac{16}{15}\right\}$

\_\_\_\_\_ 4. If  $f(x) = -3e^x - 4$ , what is the range of  $g(x) = |f(x)|$ ?

- (A)
- $(-4, \infty)$
- (B)
- $(4, \infty)$
- (C)
- $(-7, \infty)$
- (D)
- $(7, \infty)$
- (E)
- $(-\infty, -7]$

\_\_\_\_\_ 5. If  $g(x) = \frac{2-5x}{3x-7}$ , then the range of  $g^{-1}(x)$  is

- (A)
- $\left(-\infty, -\frac{5}{3}\right) \cup \left(-\frac{5}{3}, \infty\right)$
- (B)
- $\left(-\infty, \frac{7}{3}\right) \cup \left(\frac{7}{3}, \infty\right)$
- (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) 7

\_\_\_\_\_ 6. If  $h(x) = 5 + e^{3x-1}$ , find two functions,  $f$  and  $g$ , such that  $h(x) = f(g(x))$ .

- (A)
- $f(x) = 5 + e^{3x}$
- ,
- $g(x) = x - 1$
- (B)
- $f(x) = 5 + e^{3x}$
- ,
- $g(x) = x - \frac{1}{3}$
- 
- (C)
- $f(x) = 4 + e^{3x-1}$
- ,
- $g(x) = x + 1$
- (D)
- $f(x) = 5 + e^{3x+1}$
- ,
- $g(x) = x - 1$
- (E)
- $f(x) = 5x$
- ,
- $g(x) = e^{3x-1}$

\_\_\_\_\_ 7. If  $g(x) = 3\sqrt{7-x}$ ,  $h(x) = 3+3x$ , and  $j(x) = 5-2x$ , what is the domain of  $p(x) = \frac{g(x)}{(h \circ j)(x)}$ ?

- (A)
- $(-\infty, \infty)$
- (B)
- $(-\infty, 3) \cup (3, \infty)$
- (C)
- $(-\infty, 7]$
- (D)
- $(-\infty, 3) \cup (3, 7]$
- (E)
- $[7, \infty)$

\_\_\_\_\_ 8. In the function  $g(x) = 4\sqrt{x}$ , the 4 vertically stretches the graph of  $f(x) = \sqrt{x}$  by a factor of 4. This is equivalent to what other transformation on  $f$  to produce the graph of  $g$ ?

- (A) Horizontal compression bfo 2 (B) Horizontal compression bfo 4 (C) Horizontal stretch bfo 2
- 
- (D) Horizontal compression bfo 16 (E) Horizontal stretch bfo 16



Part II: Free Response

Show all work in the space provided. Label each part, 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  $f(x) = \frac{7}{5} + \frac{3}{4} \ln\left(\frac{5}{4} - 3x\right)$

(a) Write  $f(x)$  in standard transformation form.

(b) Find the **simplified, exact value** of the  $y$ -intercept. Show the work that leads to your answer.

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

(d) Find  $D_f$  :

(e) Find  $R_f$  :

(f) Find the **Equation(s)** of any/all asymptotes. Be sure to label which type they are.

(g) Find  $\lim_{x \rightarrow -\infty} f(x)$