Name KEY Date Period

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.

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

$\frac{1}{3(x+\frac{2}{3})} = \frac{1}{3}\left(\frac{1}{x+\frac{2}{3}}\right)$

↳ Vert comp bfo 3

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

$p(x)=\frac{5\sqrt{\frac{1}{2}-2x}}{4-4(5+5x)} = \frac{5\sqrt{\frac{1}{2}-2x}}{-16-20x}$

$\frac{1}{2}-2x\geq 0$, $-2x\geq -\frac{1}{2}$, $x\leq\frac{1}{4}$; $-16-20x\neq 0$, $20x\neq -16$, $x\neq -\frac{4}{5}$

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

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

C 3. If $Q(x)=\dfrac{3}{4x-1}$, 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) $g(x)=\frac{3}{x}, f(x)=\frac{4}{3}x-1$

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

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

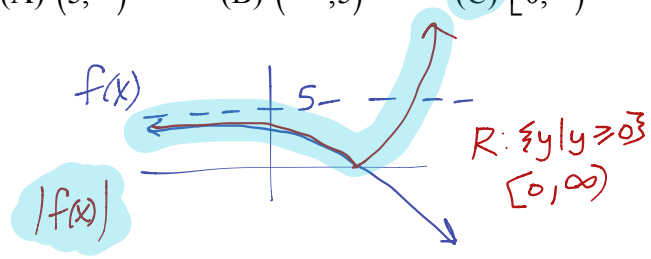
f & g are inverses

(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) $\mathbb{R}$

$7x+5\neq 0$, $7x\neq -5$, $x\neq -\frac{5}{7}$

C 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) $(-\infty,1]$



E 6. If $f(x)=3-\ln(2+5x)$, what is the domain of $f(x)$?

(A) $\left\{x\middle|x<\frac{2}{5}\right\}$ (B) $\left\{x\middle|x\le\frac{2}{5}\right\}$ (C) $\left\{x\middle|x<-\frac{2}{5}\right\}$ (D) $\left\{x\middle|x\ge-\frac{2}{5}\right\}$ (E) $\left\{x\middle|x>-\frac{2}{5}\right\}$

$2+5x>0$

$5x>-2$

$x>-\frac{2}{5}$

A 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) $\left[-\frac{1}{2},5\right)\cup(5,\infty)$

$h(x)=g(f(x))$

$=\frac{3}{\sqrt{2x+1}-5}$

$2x+1\ge0$

$2x\ge-1$

$x\ge-\frac{1}{2}$

$\sqrt{2x+1}-5\neq0$

$\sqrt{2x+1}\neq5$

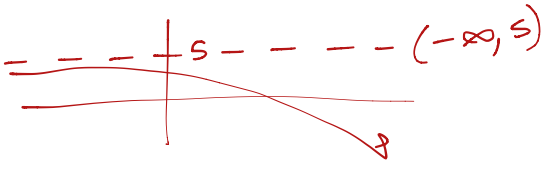
$2x+1\neq25$

$2x\neq24$

$x\neq12$

D 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 FUCNTIONS.

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.

$f(x)=\frac{4}{5}e^{\left(-\frac{2}{7}(x-7)\right)}+\frac{8}{3}$ √1

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

1. Vert comp bfo 5/4
2. y-axis reflection
3. Horz stretch bfo 7/2
4. Right 7
5. up 8/3

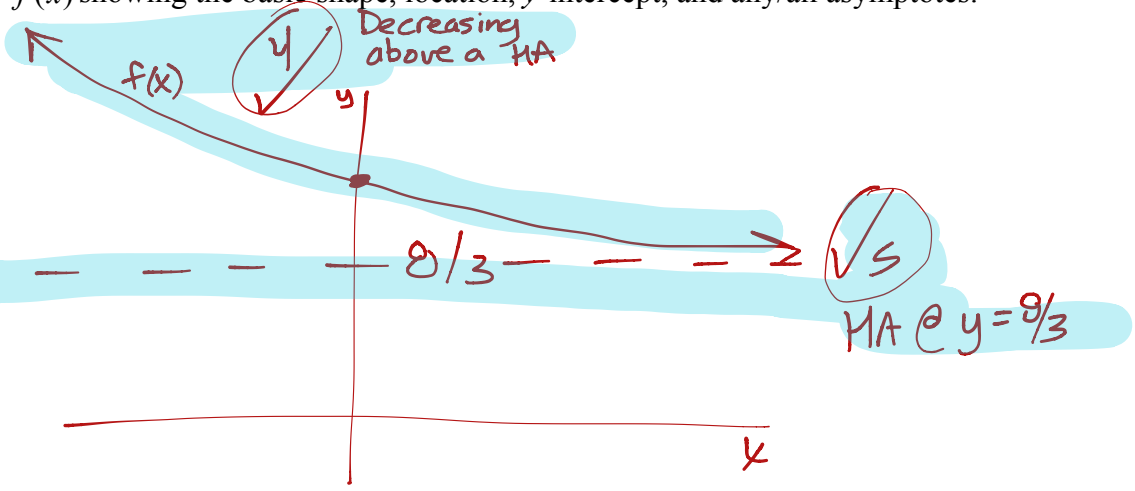
√2

(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.

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

$f(0)=\frac{8}{3}+\frac{4}{5}e^{2}$ √3

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



(e) Find D_f : $D_f: \mathbb{R}$

(f) Find R_f : $R_f: \{y \mid y > 8/3\}$ or $(8/3, \infty)$

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

HA @ $y = 8/3$

(h) $\lim_{x \to \infty} f(x) = 8/3$