

Name

KEY

Date

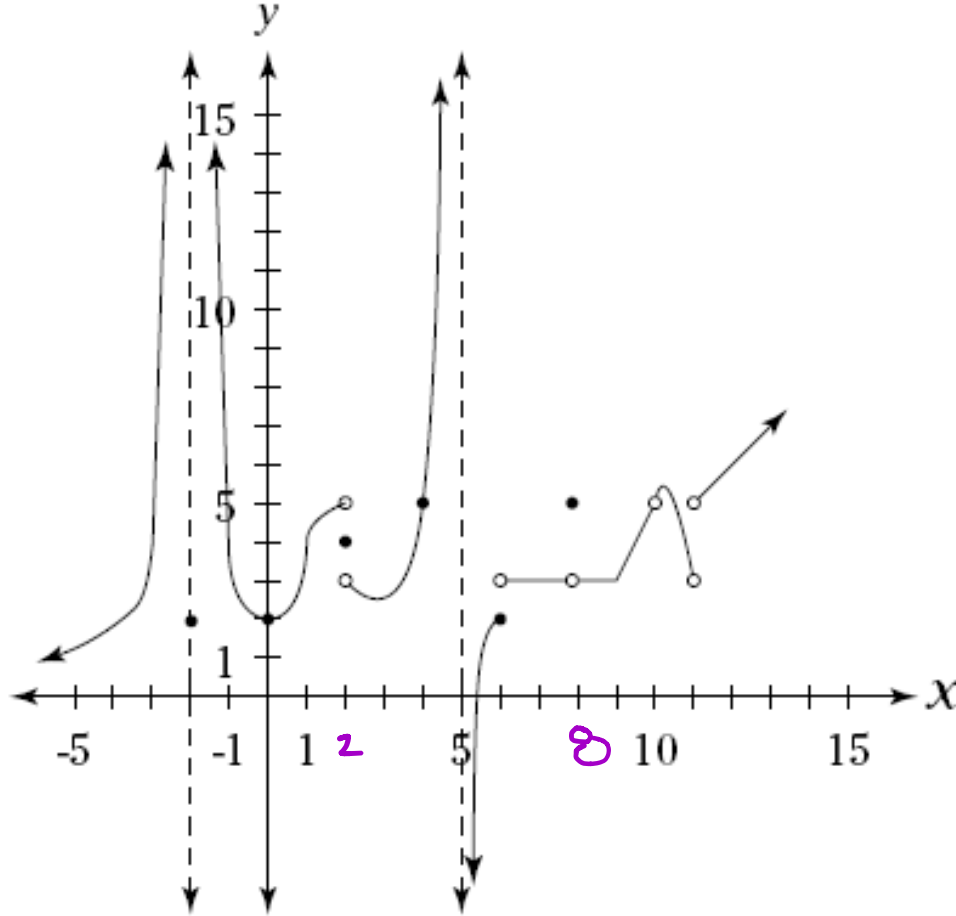
18 TOTAL CHECKS

Period

9 M.C., 9 F.R.
50% 50%

PCPAP TEST: Chapter 1.1-2.2 2015 No Calculator

Part I: Multiple Choice. Put the CAPITAL letter in each blank to the left of the problem number.

The graph of $g(x)$ is given above. Use the graph to answer questions 1-4.

A 1. $\lim_{x \rightarrow 6^+} g(x) =$ (A) 3 (B) 4 (C) 5 (D) 6 (E) DNE

B 2. $\lim_{x \rightarrow 11^-} g(x) =$ (A) 2 (B) 3 (C) 4 (D) 5 (E) DNE

A 3. $\lim_{x \rightarrow 8} g(x) =$ (A) 3 (B) 4 (C) 5 (D) 6 (E) DNE

B 4. $g(2) =$ (A) 3 (B) 4 (C) 5 (D) 6 (E) DNE

D 5. The function $f(x) = \frac{x(x+5)(x-7)(2x+1)(3x-2)}{(x-7)(3x-2)(x+5)(2x-1)}$ has a non-removable infinite discontinuity at

- (A) $x=7$ (B) $x=\frac{2}{3}$ (C) $x=-5$ (D) $x=\frac{1}{2}$ (E) $x=0$

$\checkmark$ at $x = \frac{1}{2}$

D 6. If $f(x) = \frac{-7}{x+2}$ and $g(x) = \sqrt{2x-1}$, what is the domain of $h(x) = f(g(x))$?

- (A) $\left[-2, \frac{1}{2}\right]$ (B) $(-\infty, -2) \cup \left[-2, -\frac{1}{2}\right]$ (C) $\left[\frac{1}{2}, \frac{5}{2}\right] \cup \left(\frac{5}{2}, \infty\right)$ (D) $\left[\frac{1}{2}, \infty\right)$ (E) $\left(-\infty, \frac{1}{2}\right]$

$h(x) = \frac{-7}{\sqrt{2x-1} + 2}$ $2x-1 \geq 0$
 $x \geq \frac{1}{2}$

Denom
 $2x-1 \neq (-2)^2$

$2x \neq 5$
 $x \neq \frac{5}{2}$ check

$x = \frac{5}{2}$ actually works.

(extraneous soln)

E 7. Expand and simplify the following: $(2\sqrt[3]{x} - 3x)\left(\frac{4}{x^2} + 5x^2\right) = (2x^{\frac{1}{3}} - 3x)(4x^{-2} + 5x^2) = 8x^{-\frac{5}{3}} + 10x^{\frac{7}{3}} - 12x^{-1} - 15x^3$

(A) $\frac{8}{\sqrt[3]{x^5}} + 10\sqrt[3]{x^7} - \frac{12}{x} - 15x^3$

(B) $\frac{8}{\sqrt[3]{x^5}} + \sqrt[3]{10x^7} - \frac{12}{x} - 15x^3$

(C) $\frac{8}{\sqrt[3]{x^5}} + 10\sqrt[3]{x^7} + 12x - 15x^3$

(D) $8\sqrt[3]{x^5} + \sqrt[3]{10x^7} - \frac{12}{x} - 15x^3$

(E) $\frac{8}{\sqrt[3]{x^5}} + 10\sqrt[3]{x^7} - \frac{12}{x} + 15x^3$

D 8. Simplify: $\frac{3xy^2 + 2x^{-1}y^{-2}}{3x^2y^{-1} + 2x^{-1}y^3} = \frac{\frac{3xy^2}{1} + \frac{2}{xy^2}}{\frac{3x^2}{y} + \frac{2y^3}{x}} \cdot \frac{xy^2}{xy^2} = \frac{3x^2y^4 + 2}{3x^3y + 2y^5}$

(A) $\frac{3x^3y^2 + 2x}{3x^2y + 2y^3}$

(B) $\frac{3xy^3 + 2x}{3x^2 + 2xy^5}$

(C) $\frac{y^3 + 1}{x + y}$

(D) $\frac{3x^2y^4 + 2}{3x^3y + 2y^5}$

(E) $\frac{3x^2y^3 - 2}{3xy^3 + 2y^5}$

B 9. The domain of the complex fraction $B(x) = \frac{\frac{5}{x} + \frac{x-3}{x-4}}{\frac{x-4}{x}}$ is D_B .

$x \neq 0, 1, 4$

$\frac{x-4}{x} \neq 0, x-4 \neq 0, x \neq 4$

(A) $\{x | x \neq 0, 1\}$

(B) $\{x | x \neq 0, 1, 4\}$

(C) $\{x | x \neq 1, 4\}$

(D) $\{x | x \neq 0, 1, 3\}$

(E) $\{x | x \neq 0, 1, 3, 5\}$

Part II: Free Response

Show all work in a logical, vertical sequence and use proper notation. Your bottom line in each problem will be your answer. Work each problem in the space provided.

10. For the following functions, $f(x) = 3 - 2\sqrt{9 - 3x}$, $g(x) = \sqrt{x + 18}$, $h(x) = x^2 + x - 30$ answer the following questions.

- (a) Set up and simplify the **equation** for the function $P(x) = g(h(x))$, and then find the domain. Show the work that leads to your answer. Give your domain in either proper set or interval notation.

$$\begin{aligned}
 P(x) &= g(h(x)) \\
 &= \sqrt{(x^2 + x - 30) + 18} \\
 P(x) &= \sqrt{x^2 + x - 12}
 \end{aligned}$$

$\checkmark_1$ $x^2 + x - 12 \geq 0$
 $(x+4)(x-3) \geq 0$

$$D_P: \{x \mid x \leq -4 \text{ or } x \geq 3\}$$

$\checkmark_3$

- (b) Set up the **equation** for the function $R(x) = \frac{x-1}{g(x)}$, and then find the domain of $R(x)$. Show the work that leads to your answer. Give your domain in either proper set or interval notation.

$$R(x) = \frac{x-1}{\sqrt{x+18}}$$

$$D_R: \{x \mid x > -18\}$$

$x+18 > 0$
 $x > -18$

$\checkmark_4$

- (c) Set up the **equation** for the function $J(x) = \frac{f(x)}{h(x)}$, and then find the domain of $J(x)$. Show the work that leads to your answer. Give your domain in either proper set or interval notation.

$$J(x) = \frac{3 - 2\sqrt{9 - 3x}}{x^2 + x - 30}$$

Radical

$$\begin{aligned} 9 - 3x &\geq 0 \\ -3x &\geq -9 \\ x &\leq 3 \end{aligned}$$

Denom

$$\begin{aligned} x^2 + x - 30 &\neq 0 \\ (x + 6)(x - 5) &\neq 0 \\ x &\neq -6, x \neq 5 \end{aligned}$$

$$D_J: \{x \mid x \leq 3, x \neq -6\}$$

$\uparrow$ $\sqrt{5}$ $\uparrow$ $\sqrt{6}$

(No deduction if $x \neq 5$ is included, but lose a pt if exclude a different value)

- (d) Set up and **completely simplify** $\frac{h(x+w) - h(x)}{w}$ for some constant w . Show the work that leads to your answer. $h(x) = x^2 + x - 30$

$$\frac{\cancel{\sqrt{7}} \left[(x+w)^2 + (x+w) - 30 \right] - \cancel{\sqrt{8}} \left[x^2 + x - 30 \right]}{w}$$

$$\frac{x^2 + 2xw + w^2 + x + w - 30 - x^2 - x + 30}{w}$$

$$\frac{w(2x + w + 1)}{w}$$

$$\boxed{2x + w + 1} \quad \cancel{\sqrt{9}}$$

F.R.

9 checks total