

PCPAP TEST: Chapter 1.1-2.1 Form A
No Calculator

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

- C 1. The domain of $f(x) = \frac{\sqrt{3-x}}{x^2-4x}$ is D_f : $3-x \geq 0$
 $x \leq 3, x \neq 0, 4$
- (A) $(-\infty, \infty)$ (B) $\{x|x \geq 3, x \neq 4\}$ (C) $\{x|x \leq 3, x \neq 0\}$ (D) $(-\infty, 0) \cup (0, 4) \cup (4, \infty)$

- C 2. Find the domain of $h(x) = \frac{\sqrt{x+9}}{x^2-4x-32}$. D_h : $x \geq -9$ $(x-8)(x+4) \neq 0$
 $x \neq 8, -4$
- (A) $(-\infty, -9]$ (B) $[-9, \infty)$ (C) $[-9, -4) \cup (-4, 8) \cup (8, \infty)$ (D) $(-\infty, -9) \cup (-9, -4) \cup (-4, 8) \cup (8, \infty)$

- C 3. Expand and simplify the following: $(4\sqrt{x} - 3x^2)\left(\frac{2}{x^2} - 4\right)$ $(4x^{1/2} - 3x^2)(2x^{-2} - 4)$
 $8x^{-3/2} - 16x^{1/2} - 6x^0 + 12x^2$
- (A) $\frac{8}{\sqrt{x^3}} - 16\sqrt{x} - 6x + 12x^2$ (B) $\frac{8}{\sqrt[3]{x^2}} - 16\sqrt{x} - 6 + 12x^2$ (C) $\frac{8}{\sqrt{x^3}} - 16\sqrt{x} - 6 + 12x^2$
- (D) $\frac{8}{\sqrt[3]{x^2}} - 16\sqrt{x} - 6x + 12x^2$ (E) $\frac{8 - 16\sqrt{x} - 6 + 12x^2}{\sqrt{x^3}}$

- D 4. If $f(x) = \frac{2}{x}$ and $g(x) = \sqrt{x+1}$, what is the domain of $h(x) = (f \circ g)(x)$? $h(x) = \frac{2}{\sqrt{x+1}}$ $x > -1$
- (A) $(-\infty, -1) \cup (-1, \infty)$ (B) $[-1, \infty)$ (C) $(-\infty, -1)$ (D) $(-1, \infty)$ (E) all real numbers

- A 5. Simplify: $\frac{4x^2y^{-2} + 3x^{-2}y^3}{xy^{-1} + 2x}$ $\frac{\frac{4x^2}{y^2} + \frac{3y^3}{x^2}}{\frac{xy}{x} + 2x} = \frac{\frac{4x^4}{x^2y^2} + \frac{3y^5}{x^2y^2}}{\frac{xy^4}{x^3y^2} + 2y^2} = \frac{4x^4 + 3y^5}{x^3y + 2x^3y^2}$
- (A) $\frac{4x^4 + 3y^5}{x^3y + 2x^3y^2}$ (B) $\frac{4x^4\sqrt{y} + 3\sqrt{x}y^4}{1 + 2y}$ (C) $\frac{4x^4y + 3xy^4}{1 + 2x^3y}$ (D) $\frac{4xy + 3y^2}{x^2y + 2x^2}$ (E) $\frac{4x^4 + 3y^5}{2x^3y + x^3y^2}$

- D 6. Simplify the following expression: $\left(\frac{2\sqrt{x}\sqrt[3]{y}}{4x^{-1}y^2}\right)^{-1}$ $\frac{4x^{-1}y^2}{2x^{1/2}y^{2/3}} = 2x^{-3/2}y^{2/3}$
- (A) $2x^{1/2}y^{5/3}$ (B) $\frac{1}{2}x^{1/2}y^{5/3}$ (C) $\frac{y^{5/3}}{2x^{3/2}}$ (D) $\frac{2y^{5/3}}{x^{3/2}}$ (E) $2x^{3/2}y^{5/3}$

- E 7. Rationalize and simplify: $\frac{\sqrt{x} + 2}{x^2 - 4x}$ $\frac{(\sqrt{x} - 2)}{x(\sqrt{x} - 2)} = \frac{(\sqrt{x} + 4)}{x(\sqrt{x} - 2)(\sqrt{x} + 2)} = \frac{1}{x^{3/2} - 2x}$
- (A) $\frac{x^2 - 4x}{\sqrt{x} + 2}$ (B) $\frac{1}{x}$ (C) $\frac{1}{\sqrt{x^3} - 2}$ (D) $\frac{x + 4}{x^2 - 4x}$ (E) $\frac{1}{\sqrt{x^3} - 2x}$

Part II: Free Response

Show all work in a logical, vertical sequence and use proper notation. Box your final answers.

Work each problem below the given line. Be sure to label individual parts appropriately. No credit will be given for any problems worked above the line.

7. For the following functions $f(x) = 6x^2 + x - 2$, $g(x) = \sqrt{4 - 9x}$, $h(x) = 2 - 3x$, $T(x) = x^2 - 2x - 35$ answer the following questions.

(a) Set up the equation for the function $k(x) = h(g(x))$ in standard transformation form, then sketch the graph showing the exact value of the y-intercept. Use proper notation.

(b) Solve the inequality $f(x) \geq 0$ graphically. Be sure to find your x-intercepts and show your graph. Use proper notation to give your answer.

(c) Set up the equation for the function $J(x) = \frac{g(x)}{T(x)}$, then find the domain of $J(x)$. Show the analysis that leads to your answer, and use proper notation in your final answer. DO NOT DOUBLY EXCLUDE ANY VALUES IN YOUR FINAL ANSWER!

(d) Evaluate and completely simplify $\frac{f(x+c) - f(x)}{c}$ for some constant c .

(a) $k(x) = h(g(x))$
 $= 2 - 3\sqrt{4 - 9x}$ (✓1)
 $k(x) = -3\sqrt{4 - 9(x - \frac{4}{9})} + 2$ (✓2)
 $k(0) = 2 - 6 = -4$ (✓3)

(b) $f(x) \geq 0$
 $6x^2 + x - 2 \geq 0$
 $(3x + 2)(2x - 1) \geq 0$
 $\{x \mid x \leq -\frac{2}{3} \text{ or } x \geq \frac{1}{2}\}$ (✓4)
or $(-\infty, -\frac{2}{3}] \cup [\frac{1}{2}, \infty)$ (✓5)

(c) $J(x) = \frac{g(x)}{T(x)}$
 $J(x) = \frac{\sqrt{4 - 9x}}{x^2 - 2x - 35}$
 $4 - 9x \geq 0$ (✓6) $x^2 - 2x - 35 \neq 0$ (✓7)
 $-9x \geq -4$ $(x - 7)(x + 5) \neq 0$
 $x \leq \frac{4}{9}$ $x \neq 7, -5$
 $D_J: \{x \mid x \leq \frac{4}{9}, x \neq -5\}$ (✓8)
or $D_J: (-\infty, -5) \cup (-5, \frac{4}{9}]$

(d) $f(x) = 6x^2 + x - 2$
 $\frac{f(x+c) - f(x)}{c}$ (✓9)
 $\frac{[6(x+c)^2 + (x+c) - 2] - [6x^2 + x - 2]}{c}$ (✓10)
 $\frac{6x^2 + 12xc + 6c^2 + x + c - 2 - 6x^2 - x + 2}{c}$
 $\frac{12xc + 6c^2 + c}{c}$
 $12x + 6c + 1$ (✓11)

18 total checks

END
DATE