

PCPAP TEST: Chapter 2.1-2.2
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 : $3-x \geq 0$
 $x \leq 3$ $x(x-4) \neq 0$
 $x \neq 0, 4$

(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 : $x+9 \geq 0$
 $x \geq -9$ $(x-8)(x+4) \neq 0$
 $x \neq 8, -4$

(A) $(-\infty, -9]$ (B) $[-9, \infty)$ (C) $[-9, -4) \cup (-4, 8) \cup (8, \infty)$ (D) $(-\infty, -9) \cup (-9, -4) \cup (-4, 8) \cup (8, \infty)$

D 3. Which of the following is the equation of an asymptote on the graph of $f(x) = \frac{x^2-1}{x^2-6x+5}$? H.A. $y=1$
 $(x-5)(x+1)$
 $(x-5)(x+1)$
V.A. $x=5$

(A) $x=1$ (B) $x=-5$ (C) $y=0$ (D) $y=1$ (E) $y=-1$

B 4. If $f(x) = \frac{2}{x+1}$ and $g(x) = \sqrt{x+1}$, what is the domain of $h(x) = (f \circ g)(x)$? $h(x) = \frac{2}{\sqrt{x+1} + 1}$ $x+1 \geq 0$
 $x \geq -1$
 $\frac{2}{\sqrt{x+1} + 1} \neq 0$
No real soln

(A) $(-\infty, -1) \cup (-1, \infty)$ (B) $[-1, \infty)$ (C) $(-\infty, -1)$ (D) $(-1, \infty)$ (E) all real numbers

C 5. If $f(x) = \frac{2x^2-3x+4x^3}{3x^2-7x^3+8x^4-3}$, find $\lim_{x \rightarrow \infty} f(x)$

(A) $\frac{2}{3}$ (B) $-\frac{4}{7}$ (C) 0 (D) ∞ (E) $-\infty$

D 6. The function $f(x) = \frac{x(x-1)(x+2)(x-3)(x+4)}{(x+1)(x+2)(x+3)(x-4)}$ has a removable point discontinuity at

(A) $(-2, 5)$ (B) $(2, 10)$ (C) $(2, -5)$ (D) $(-2, -10)$ (E) None of these

$(-2, \frac{-2(-2)(-5)(-3)}{-1(1)(-4)})$
 $(-2, -10)$

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

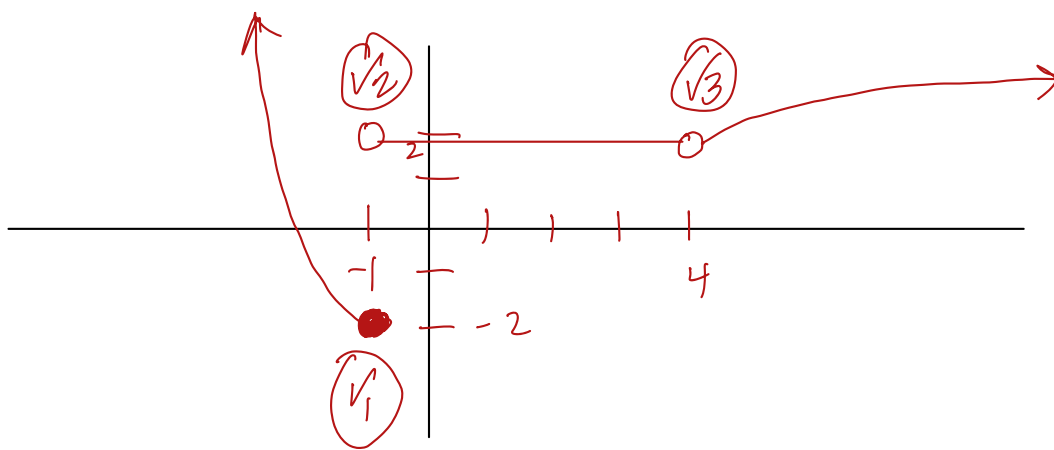
(A) $\frac{x^2-4x}{\sqrt{x}+2}$ (B) $\frac{1}{\sqrt{x^3}-2}$ (C) $\frac{2}{x-4}$ (D) $\frac{1}{\sqrt{x^3}-2x}$ (E) $\frac{x+4}{x^2-4x}$

Part II: Free Response

Show all work BELOW THE LINE. No credit will be given for anything written above the line on each problem.

8. Sketch the following piecewise function. Be sure to label the axes at points where the graph changes, show all asymptotes, and clearly show open vs. closed circles.

$$f(x) = \begin{cases} x^2 - 3, & x \leq -1, \quad (-1)^2 - 3 = -2 \text{ (solid)} \\ 2, & -1 < x < 4 \\ \sqrt{x}, & x > 4 \quad \sqrt{4} = 2 \text{ open} \end{cases}$$



9. Given the graph of the following piecewise function $f(x)$, answer the questions that follow.

$\sqrt{4}$ (a) $\lim_{x \rightarrow -2^-} f(x) = \infty$

$\sqrt{5}$ (b) $\lim_{x \rightarrow 2^+} f(x) = 3$

$\sqrt{6}$ (c) $f(6) = 2$

$\sqrt{7}$ (d) $\lim_{x \rightarrow 8} f(x) = 3$

$\sqrt{8}$ (e) $\lim_{x \rightarrow 9^-} f(x) = 3$

$\sqrt{9}$ (f) $\lim_{x \rightarrow \infty} f(x) = \infty$

