PreCalculus ACC '18-19   Name: <u>SOLUTION KEY</u>
Dr. Quattrin
Radical Test
CALCULATOR ALLOWED
Round to 3 decimal places.   Score _____
Show all work.

1. Find the zeros, domain, and End Behavior $y=-\sqrt{5x^3-3x^2-10x+6}$ on $x\in\left[-\sqrt{2},4\right]$.

$x^2(5x-3)-2(5x-3)$

zeros $\underline{\left(\pm\sqrt{2},0\right)\ \left(3/5,0\right)}$

$y^2 - \begin{array}{|ccccccc|} \hline 0 & + & & 0 & - & & 0 & + \\ \hline \end{array}$

domain $\underline{x\in\left[-\sqrt{2},3/5\right]\cup\left[\sqrt{2},4\right]}$

$x \quad -\sqrt{2} \qquad 3/5 \quad \sqrt{2}$

$\qquad\qquad\qquad\qquad\qquad\qquad\qquad 4$
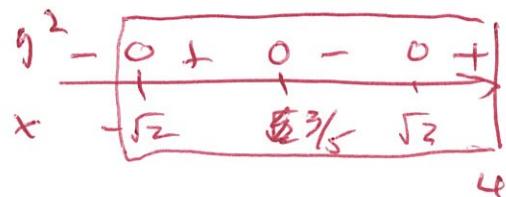
Left End Behavior <u>NONE</u>

Right End Behavior <u>NONE</u>

2. Extreme points of $y=-\sqrt{5x^3-3x^2-10x+6}$ on $x\in\left[-\sqrt{2},4\right]$.

$\dfrac{dy}{dx}=-\dfrac{1}{2}\left(5x^3-3x^2-10x+6\right)^{-\frac{1}{2}}\left(15x^2-6x-10\right)$

$=\dfrac{15x^2-6x-10}{2\left(5x^3-3x^2-10x+6\right)^{1/2}}$

i) $15x^2-6x-10=0 \Rightarrow x=\dfrac{6\pm\sqrt{36-4(15)(-10)}}{2(15)}=\begin{cases}1.041\\-.641\end{cases}$ $(-.641,-3.140)$

ii) $5x^3-3x^2-10x+6=0 \Rightarrow x=\pm\sqrt{2},\,3/5$ $(\pm\sqrt{2},0)$

$(3/5,0)$

iii) $x=4$ $(4,-3.137)$

3. Find the zeros, domain, and End Behavior $y=\sqrt{\dfrac{-6x}{x^2-9}}$.

zeros $\underline{\quad (0,0) \quad}$

domain $\underline{\quad x \in (-\infty, -3) \cup [0, 3) \quad}$

$y^2 + \quad VA \quad - \quad 0 \quad + \quad VA \quad -$

(number line with points at -3, 0, 3)
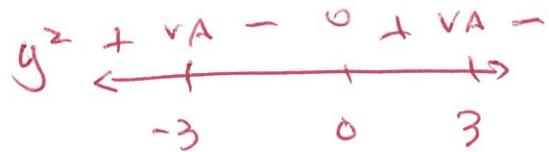
VAs $\underline{\quad x = \pm 3 \quad}$

Left End Behavior $\underline{\quad y=0 \quad}$

Right End Behavior $\underline{\quad NONE \quad}$

4. Extreme points of $y=\sqrt{\dfrac{-6x}{x^2-9}}$.

$$\frac{dy}{dx} = \frac{1}{2}\left(\frac{-6x}{x^2-9}\right)^{-1/2}\left[\frac{(x^2-9)(-6)+6x(2x)}{(x^2-9)^2}\right]$$

$$= \frac{(x^2-9)^{1/2}\left[-6x^2+54+12x^2\right]}{2(-6x)^{1/2}(x^2-9)^2} = \frac{3x^2+27}{(-6x)^{1/2}(x^2-9)^{3/2}}$$

i) $3x^2+27=0 \rightarrow$ NO SOLUTION

ii) $-6x=0 \rightarrow x=0$

$x^2-9=0 \rightarrow x=\pm 3$ ~~(crossed out)~~

iii) NO RESTRICTION

$(0, 0)$

5. Find the zeros, domain, and End Behavior $y=\sqrt{-2x^4+9x^2-4}$

zeros $\left(\pm 2, 0\right), \left(\pm \frac{1}{\sqrt{2}}, 0\right)$

domain $x \in \left(2, -\frac{1}{\sqrt{2}}\right) \cup \left(\frac{1}{\sqrt{2}}, 2\right)$

$-\left(2x^2-1\right)\left(x^2-4\right)$

$$y^2 \xleftarrow{\quad -\;\;0\;\;+\;\;0\;\;-\;\;0\;\;+\;\;0\;\;-\;\;}$$
$$\qquad\qquad -2 \qquad -\tfrac{1}{\sqrt{2}} \quad \tfrac{1}{\sqrt{2}} \quad 2$$
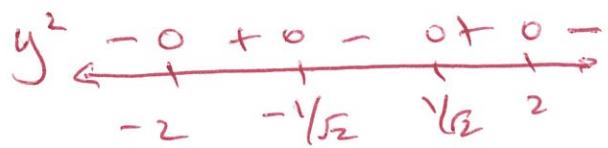
Left End Behavior ___NONE___

Right End Behavior ___NONE___

6. Extreme points of $y=\sqrt{-2x^4+9x^2-4}$.

$$\frac{dy}{dx} = \frac{-8x^3+18x}{2\left(-2x^4+9x^2-4\right)^{1/2}}$$

i) $-2x\left(4x^2-9\right)=0$

$x = \cancel{x}, \pm \frac{3}{\sqrt{2}}$

ii) $-2x^4+9x^2-4=0$

$x = \pm 2, \pm \frac{1}{\sqrt{2}}$

iii) NONE

$\pm\cancel{\tfrac{3}{\sqrt{2}}}, \left(\pm 1.5, 2.475\right)$

$\left(\pm 2, 0\right)$

$\left(\pm .707, 0\right)$

PreCalculus ACC '18-19

Name: <u>Solution Key</u>

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Radical Test

CALCULATOR NOT ALLOWED

Show all work.

Score _____

7.   Find the traits and **sketch** of $y = \sqrt{\dfrac{-6x}{x^2-9}}$.

Domain: $x \in (-\infty, -3) \cup [0, 3)$

Y – Intercept: $(0, 0)$

Zeros: $(0, 0)$

Range: $y \in [0, \infty)$

VAs: $x = \pm 3$

POEs: None

End Behavior (left): $y = 0$

End Behavior (right): None

Extreme Points: $(0, 0)$
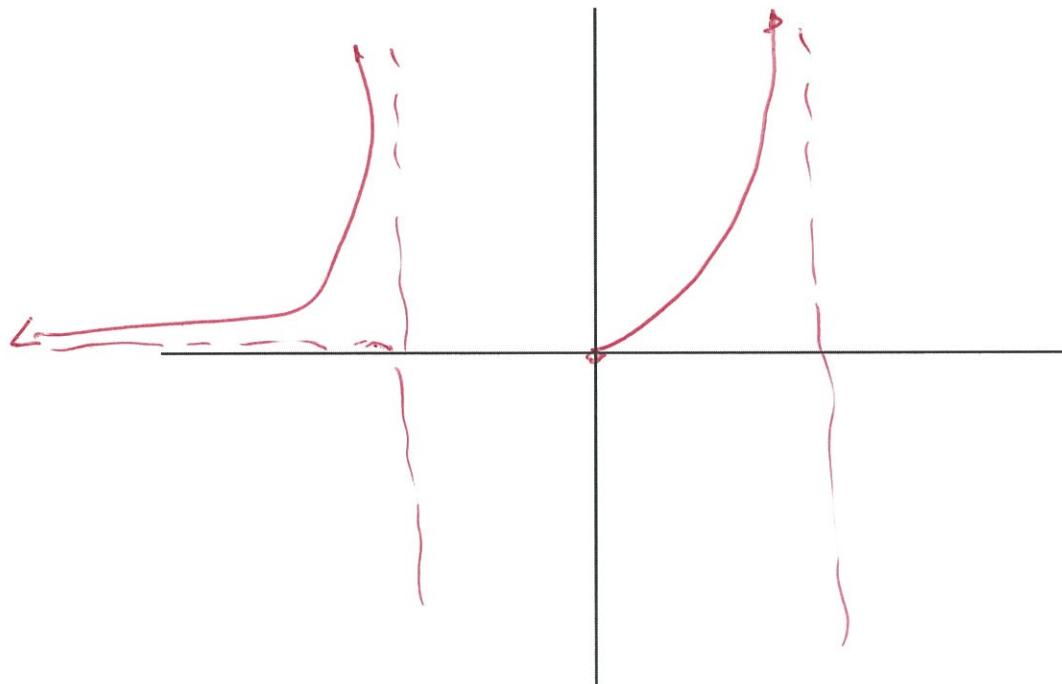
8. Find the traits and **sketch** of $y = -\sqrt{5x^3 - 3x^2 - 10x + 6}$ on $x \in \left[-\sqrt{2}, 4\right]$

Domain: See #1

Zeros: See #1

End Behavior (left): NONE

Extreme Points: See #2

Y – Intercept: $\left(0, -\sqrt{6}\right)$

Range: $y \in \left[-3.137, 0\right]$

End Behavior (right): NONE
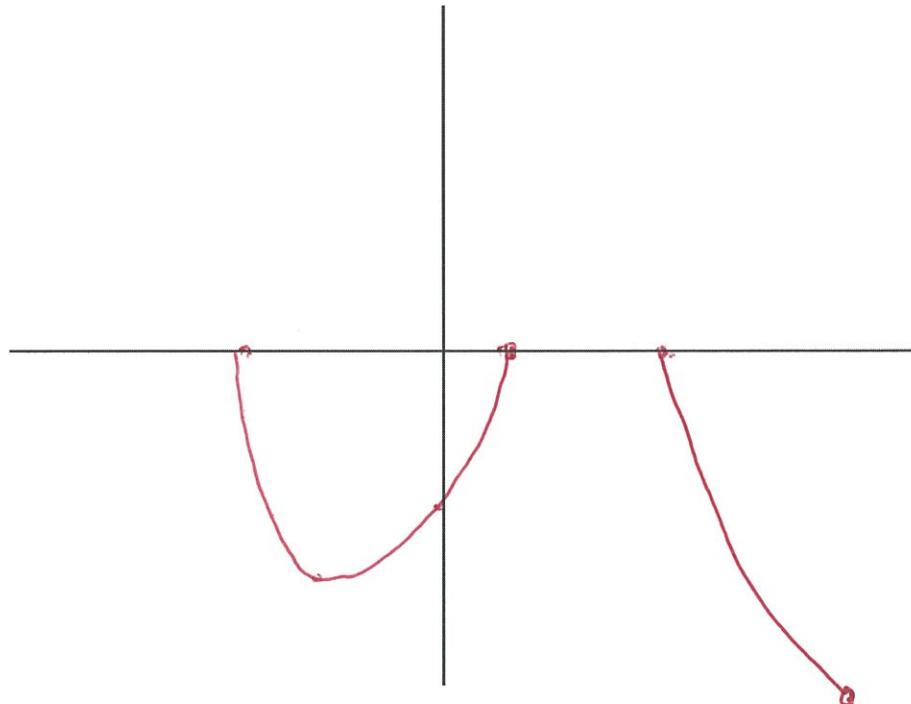
EC. Find the traits and **sketch** of $y = \sqrt{-2x^4 + 9x^2 - 4}$.

Domain: See # 5

Zeros: See #5

End Behavior (left): NONE

Extreme Points: See #6

Y – Intercept: NONE

Range: $y \in [0, \sqrt{\cdot k}, 4.75]$

End Behavior (right): NONE