PreCalculus Acc '17-18
Dr. Quattrin
Radical Test
CALCULATOR ALLOWED
Round to 3 decimal places.
Show all work.

Name: _SOLUTION KEY_
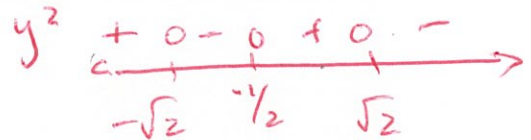
Score _____

1.   Find the zeros, domain, and End Behavior $y=\sqrt{-2x^3-x^2+4x+2}$.

$-x^2(2x+1)+2(2x+1)$

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

$$y^2 \quad \begin{array}{ccccc} + & 0 & - & 0 & + & 0 & - \\ \hline & -\sqrt{2} & & -\tfrac{1}{2} & & \sqrt{2} \end{array}$$

domain $x\in\left(-\alpha,-\sqrt{2}\right]\cup\left[-\tfrac{1}{2},\sqrt{2}\right]$

Left   End Behavior __UP__

Right End Behavior __NONE__

2.   Extreme points of $y=\sqrt{-2x^3-x^2+4x+2}$.

$$\frac{dy}{dx}=\frac{1}{2}\left(-2x^3-x^2+4x+2\right)^{-1/2}\left(-6x^2-2x+4\right)$$

$$=\frac{-3x^2-x+2}{\left(-2x^3-x^2+4x+2\right)^{1/2}}$$

i) $-3x^2-x+2=0$
$=(3x-2)(x+1)=0$
$x=\tfrac{2}{3}, \cancel{-1}$

ii) $\frac{dy}{dx}$ DNE $\rightarrow x=\pm\sqrt{2}, -\tfrac{1}{2}$

iii) NO RESTRICTION

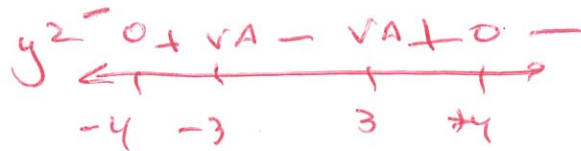$\left(\pm\sqrt{2},0\right)$

$\left(-\tfrac{1}{2},0\right)$

$\left(\tfrac{2}{3}, 1.905\right)$

3. Find the zeros, domain, and End Behavior $y=-\sqrt{\dfrac{x^2-16}{9-x^2}}$.

zeros ___$(\pm 4, 0)$___

domain___$x \in [-4, -3) \cup (3, 4]$___

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

VAs___$x = \pm 3$___

Left   End Behavior___None___

Right End Behavior___NONE___

4. Extreme points of $y=-\sqrt{\dfrac{x^2-16}{9-x^2}}$.

$$\frac{dy}{dx} = -\frac{1}{2}\left(\frac{x^2-16}{9-x^2}\right)^{-1/2}\left[\frac{(9-x^2)(2x)-(x^2-16)(-2x)}{(9-x^2)^2}\right]$$

$$= \frac{-(9-x^2)^{1/2}(18x-2x^3+2x^3-32x)}{2(x^2-16)^{1/2}(9-x^2)^2}$$

$$= \frac{+7x}{(x^2-16)^{1/2}(9-x^2)^{3/2}}$$

i) $7x=0 \rightarrow x=0$ ⊘

ii) $\dfrac{dy}{dx}$ DNE $\rightarrow x = \pm 4, \pm 3$ ⊘

iii) NONE

$(\pm 4, 0), \notin$

5. Find the zeros, domain, and End Behavior $y=-\sqrt{2x^3-3x^2-8x+12}$ on $x\in[-6,2]$

$x^2(2x-3)-4(2x-3)$

zeros $(\pm 2,0)\;(\frac{3}{2},0)$

domain $x\in[-2,3/2]\cup\{2\}$

Left End Behavior ~~✗~~ NONE

Right End Behavior ~~DOWN~~ NONE

6. Extreme points of $y=-\sqrt{2x^3-3x^2-8x+12}$ on $x\in[-6,2]$

$$\frac{dy}{dx}=-\frac{1}{2}\left(2x^3-3x^2-8x+12\right)^{-\frac{1}{2}}\left(6x^2-6x-8\right)$$

$$=\frac{3x^2-3x-4}{\left(2x^3-3x^2-8x+12\right)^{\frac{1}{2}}}$$

i) $3x^2-3x-4=0\;\rightarrow$

$x=\dfrac{3\pm\sqrt{3^2-4(3)(-4)}}{2(3)}$ $\left\{\begin{array}{l}~~1.758\\-~~\end{array}\right.$

$-.758$

$(\pm 2,0)$

$\left(\frac{3}{2},0\right)$

$(1.758,$

$\left(-.758,-3.933\right)$

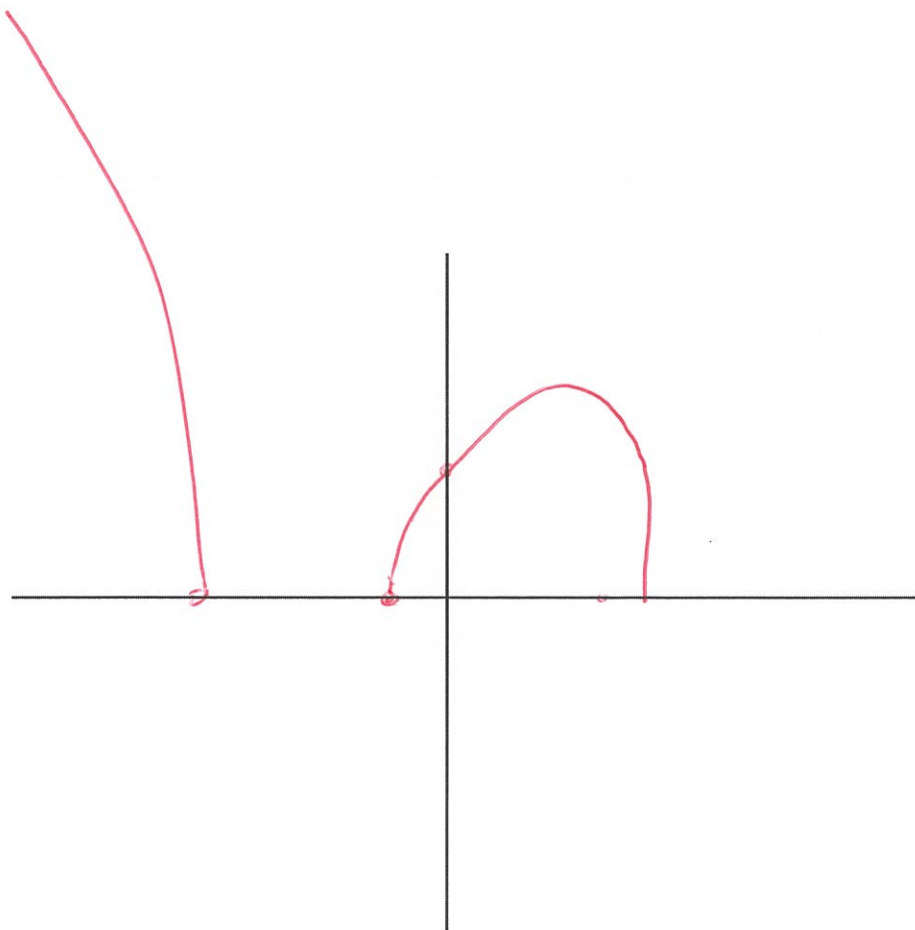ii) $x=\pm 2,3/2$

iii) $x=-6,2$

BUT -6 IS NOT IN THE DOMAIN

7.   Find the traits and **sketch** of $y = \sqrt{-2x^3 - x^2 + 4x + 2}$.

Domain: $x \in \left(-\infty, -\sqrt{2}\right] \cup \left[-\frac{1}{2}, \sqrt{2}\right]$ Range: $y \in [0, \infty)$

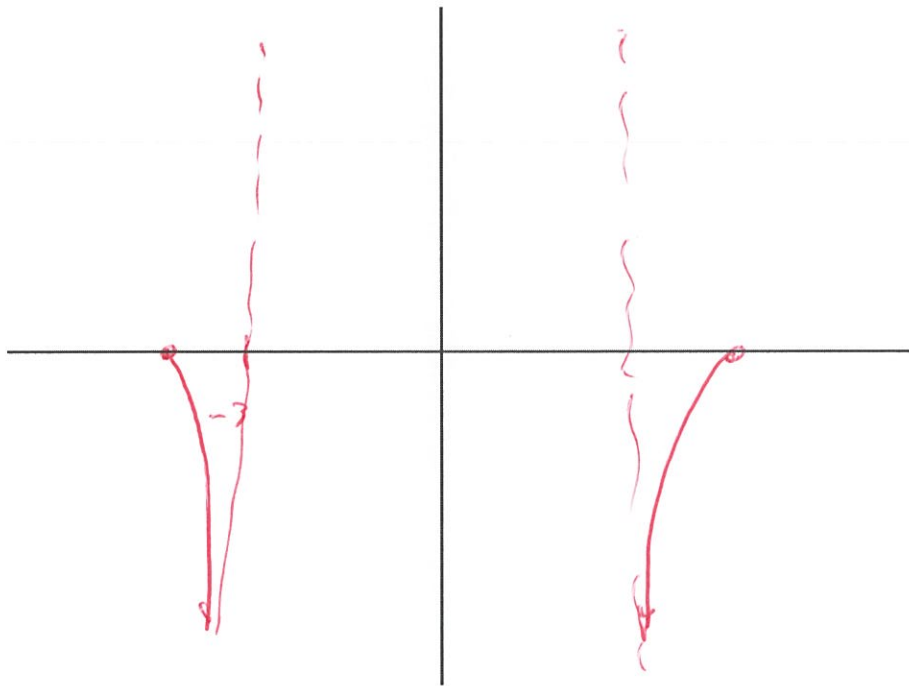Y – Int: $\left(0, \sqrt{2}\right)$ Zeros: $\left(\pm\sqrt{2}, 0\right) \left(-\frac{1}{2}, 0\right)$

8. Find the traits and **sketch** of $y=-\sqrt{\dfrac{x^2-16}{9-x^2}}$.

Domain: SEE #3

Range: $y \in (-\infty, 0]$

Y – Int: NONE

Zeros: SEE #4

9.   Find the traits and **sketch** of $y = -\sqrt{2x^3 - 3x^2 - 8x + 12}$ on $x \in [-6, 2]$

Domain: $x \in \left[-2, \frac{3}{2}\right] \cup \{2\}$ Range: $y \in [-3.933, 0]$

Y – Int: $\left(0, -\sqrt{12}\right)$ Zeros: $(-2, 0)\left(\frac{3}{2}, 0\right)$