Name: Sofie Leung Date: _____

HW Pre Calculus 12 Section 2.3 Solving Radical Functions:

1. What does it mean when an equation has an extraneous root?

The equation gives 2 answers but one doesn't fit the original equation

2. Is an extraneous root also a solution? YES or NO ?? Explain:

No. They don't exist on the graph

3. For what values of "k" will the function not have any solutions? Explain: $\sqrt{ax+b}=k$

$k<0$

4. For what values of "k" will the function not have any solutions? Explain: $\sqrt{ax^2 \pm b}=k$

$k<0$

5. How do we check for extraneous roots? Explain:

Graph the equations or plug the answers back into the equation

6. Why do extraneous roots exist? Explain:

When we solve the equations we square both sides creating the other half of the graph. Values under the x-axis can't exist

)

7. Which of the following functions will have an extraneous root? Explain:

i) $\sqrt{5x^2-3x}+2=0$

Yes

negative values

$\sqrt{5x^2-3x} = -2$

ii) $\sqrt{8-3x^2}+2=3$

$8-3x^2 = 1$

$x = \pm\sqrt{2\frac{1}{3}}$

No

iii) $\sqrt{-9x^2+20}+8=7$

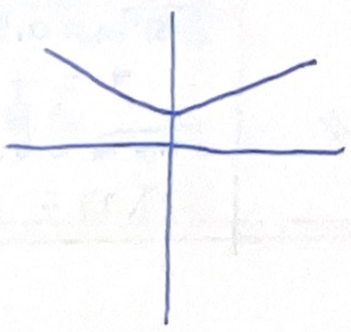
Yes

$\sqrt{-9x^2+20} = -1$

8. How do you tell whether if a square root function is either a semi circle or a semi-hyperbola? Explain:

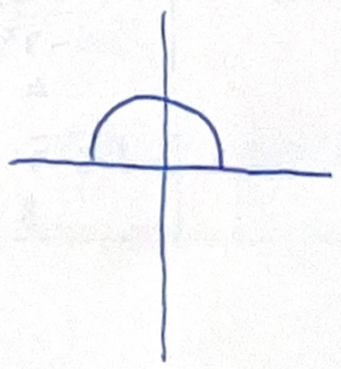
$A>0$ $B>0$ $D>0$

$y = A\sqrt{B(x-c)}+D$



$0>B$ $D>0$

$y = A\sqrt{B(x-c)}+D$



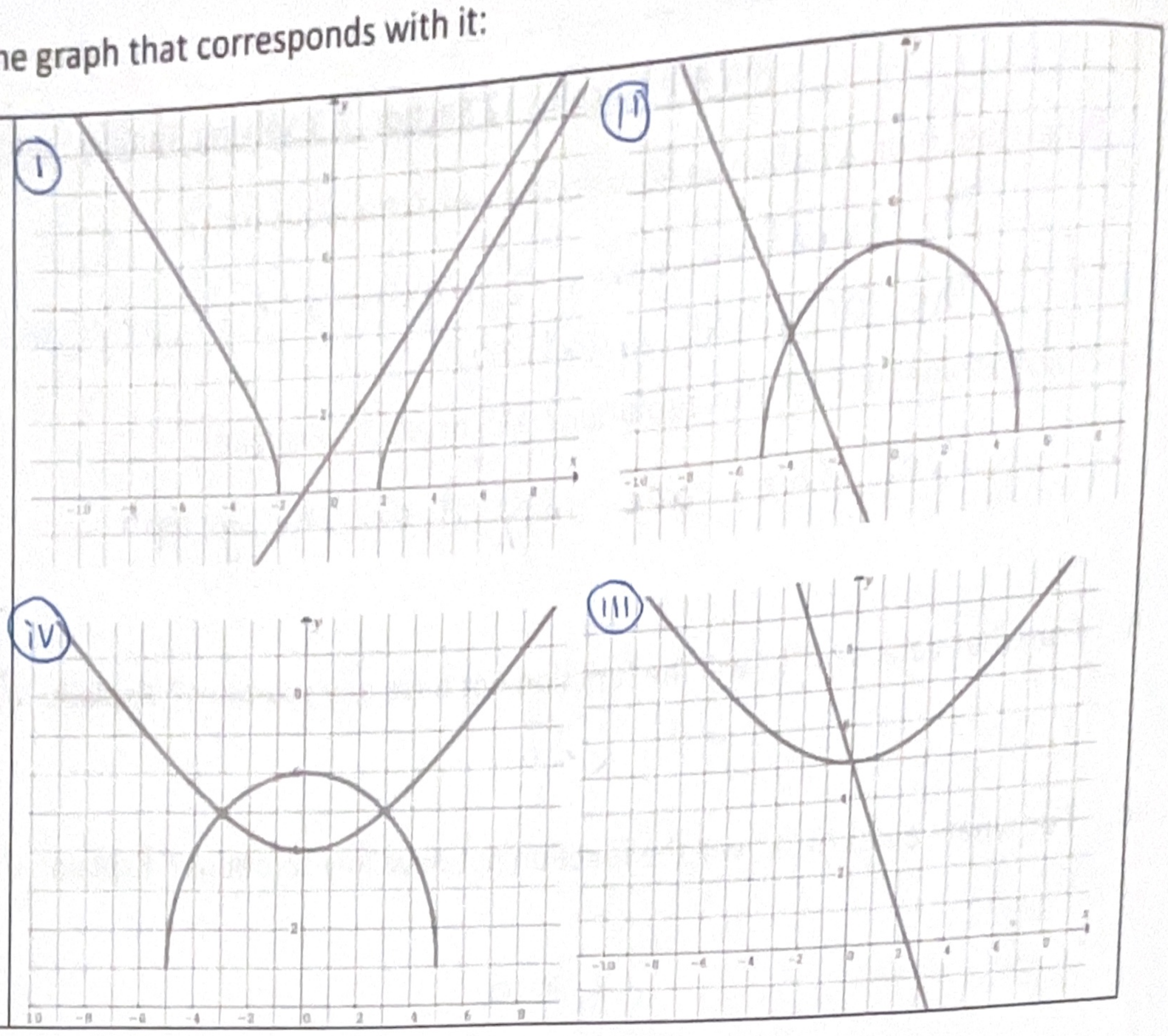
9. Match each equation with the graph that corresponds with it:

i) $\sqrt{x^2-4}=x+1$

ii) $\sqrt{25-x^2}=\frac{-3}{2}(x+4)+3$

iii) $\sqrt{25+x^2}=-2x+5$

iv) $\sqrt{x^2+16}=\sqrt{25-x^2}+1$



Solve the following equations for "x", check for extraneous roots:

a) $\sqrt{9-x^2}=x+3$

$-x^2+9 = x^2+6x+9$

$0 = 2x^2+6x$

$= 2x(x+3)$

$x=0$

$x=-3$ //

Check

$\sqrt{9-0^2} = 0+3$

$3 = 3$

$\sqrt{9-(-3)^2} = -3+3$

$0 = 0$

b) $\sqrt{16-x^2}=-x+4$

$-x^2+16 = x^2-8x+16$

$0 = 2x^2-8x$

$= 2x(x-4)$

$x = 0$

$x = 4$ //

Check

$\sqrt{16-0^2} = -0+4$

$4 = 4$

$\sqrt{16-4^2} = -4+4$

$0 = 0$

c) $\sqrt{25-x^2}=7-x$

$25-x^2 = x^2-14x+49$

$0 = 2x^2-14x+24$

$= 2(x^2-7x+12)$

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

$x=4$

$x=3$ //

Check

$\sqrt{25-3^2} = 7-3$

$4 = 4$

$\sqrt{25-4^2} = 7-4$

$3 = 3$

d) $\sqrt{x^2-9}=0.5x+6.5$

$x^2-9 = 0,25x^2+6,5+42,25$

$0,75x^2-6,5x-51,25=0$

$x = \frac{6,5 \pm \sqrt{6,5^2-4\cdot 0,75\cdot(-51,25)}}{2\cdot 0,75}$

$= \frac{6,5\pm 14}{1,5}$

$= 13,66 \;/\; -5$ //

Check

$\sqrt{(-5)^2-9} = 0,5(-5)+6,5$

$4 = 4$

$\sqrt{13,66^2-9} = 0,5(13,66)+6,5$

$13,3 = 13,3$

e) $\sqrt{(x-2)^2-25}=0.5x+2$

$(x-2)^2-25 = 0.25x^2+2x+4$

$x^2-4x+4-25 = 0.25x^2+2x+4$

$0.75x^2-6x-25 = 0$

$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

$=\frac{6\pm\sqrt{6^2-4\cdot(-25)(0.75)}}{2\cdot0.75}$

$=\frac{6\pm\sqrt{111}}{1.5}$

11.024 / -3.024 //

Check

$\sqrt{(11.024-2)^2-25}=0.5(11.024)+2$

$7.5 = 7.5$

$\sqrt{(-3.024-2)^2-25}=0.5(-3.024)+2$

$0.5 = 0.5$

f) $\sqrt{x^2+4}=-3x+2$

$x^2+4 = 9x^2-12x+4$

$0 = 8x^2-12x$

$= 4x(2x-3)$

$x=0, \frac{3}{2}$

$x=0$

Ext = $\frac{3}{2}$ //

Check

$\sqrt{0^2+4} = -3\cdot0+2$

$2 = 2$

$\sqrt{\frac{3}{2}^2+4} = -3\cdot\frac{3}{2}+2$

$2.18 = -2.5$

g) $\sqrt{x^2-4x+13}=\frac{3}{2}x+8$

$x^2-4x+13 = \frac{9}{4}x^2+24x+64$

$= \frac{5}{4}x^2+28x+51$

$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}$

$=\frac{-28\pm\sqrt{28^2-4\cdot\frac{5}{4}\cdot51}}{2\cdot\frac{5}{4}}$

$=\frac{-28\pm\sqrt{529}}{2.5}$

$= -2 / -20.4$

$x=-2$

Ext = -20.4 //

Check

$\sqrt{(-2)^2-4(-2)+13}=\frac{3}{2}(-2)+8$

$5 = 5$

$\sqrt{(-20.4)^2-4(-20.4)+13}=\frac{3}{2}(-20.4)+8$

$22.6 = -22.6$

h) $\sqrt{x^2+2x+26}=\frac{-2}{5}(x+1)+5$

$x^2+2x+26 = (-\frac{2}{5}x+\frac{23}{5})^2$

$x^2+2x+26 = \frac{4}{25}x^2-\frac{92}{25}x+\frac{529}{25}$

$\frac{21}{25}x^2+\frac{142}{25}x+\frac{121}{25} = 0$

$21x^2+142x+121 = 0$

$x=\frac{-142\pm\sqrt{142^2-4\cdot21\cdot121}}{2\cdot21}$

$=\frac{-142\pm100}{42} = -1, -\frac{121}{21}$ //

Check

$\sqrt{(-1)^2+2(-1)+26}=-\frac{2}{5}(-1+1)+5$

$5 = 5$

$\sqrt{(-\frac{121}{21})^2+2(-\frac{121}{21})+26}=-\frac{2}{5}(-\frac{121}{21}+1)+5$

$\frac{145}{21} = \frac{145}{21}$

i) $\sqrt{25-4(x-1)^2}=-(x-1)+5$

$25-4(x^2-2x+1) = (-x+6)^2$

$25-4x^2+8x-4 = x^2-12x+36$

$0 = 5x^2-20x+15$

$= 5(x^2-4x+3)$

$= 5(x-3)(x-1)$

$x=3, 1$ //

Check

$\sqrt{25-4(3-1)^2}=-(3-1)+5$

$3 = 3$

$\sqrt{25-4(1-1)^2}=-(1-1)+5$

$5 = 5$

j) $\sqrt{-5x^2+20x+16}=2x-4$

$-5x^2+20x+16 = 4x^2-16x+16$

$0 = 9x^2-36x$

$= 9x(x-4)$

$x=0, 4$

$x=4$

Ext = 0

Check

$\sqrt{-5\cdot0^2+20\cdot0+16}=2\cdot0-4$

$4 = -4$

$\sqrt{-5\cdot4^2+20\cdot4+16}=2\cdot4-4$

$4 = 4$

k) $\sqrt{9-(x+1)^2}=0.5x-5$

$9-x^2-2x-1 = 0.25x^2-5x+25$

$0 = 1.25x^2-3x+17$

$x=\frac{3\pm\sqrt{3^2-4\cdot1.25\cdot17}}{2.5}$

= NRA

L) $\sqrt{x^2+16}=-\sqrt{25-x^2}$

$x^2+16 = -x^2+25$

$2x^2-9 = 0$

$x^2 = 4.5$

$x^2 = \pm\sqrt{\frac{9}{2}}$

$= \pm\frac{3}{\sqrt{2}}$ NRA