Name:_____ Date:_____

Math 10/11 Enriched: Section 5.4 Solving Systems of Equations with Radicals

1. For what value(s) of "k" will the equation have an extraneous root?

i) $\sqrt{13x-1}=k$ ii) $3\sqrt{5x+1}+4+k=0$

2. When given an equation in the form $3x+b=\sqrt{5x+c}$, how do you tell if an answer is an extraneous root or not? Explain why extraneous roots exists.

3. Suppose you are given the equation $4x-12=3\sqrt{6x^2-8x+b}+3$ with an answer of $x=2$, is this answer an extraneous root? Explain:

4. When graphing $y=a\sqrt{bx-c}+d$, how do you know whether if the graph is opening UP or DOWN, LEFT or RIGHT? Explain:

5. Solve for "x" . Indicate any extraneous roots and restrictions on the domain:

a) $\sqrt{x}=5$	b) $2\sqrt{x+1}=5$	c) $\sqrt{3x+1}=16$
d) $-3\sqrt{4x-1}=-2$	e) $15+\sqrt{4x-3}=9$	f) $\sqrt{2x+25}=\sqrt{x+14}$

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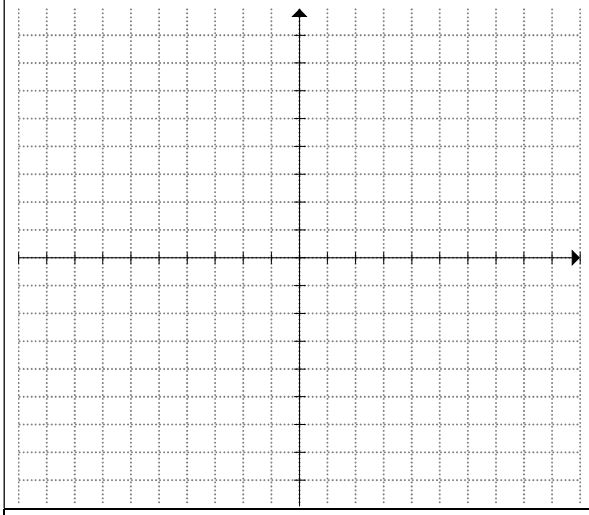
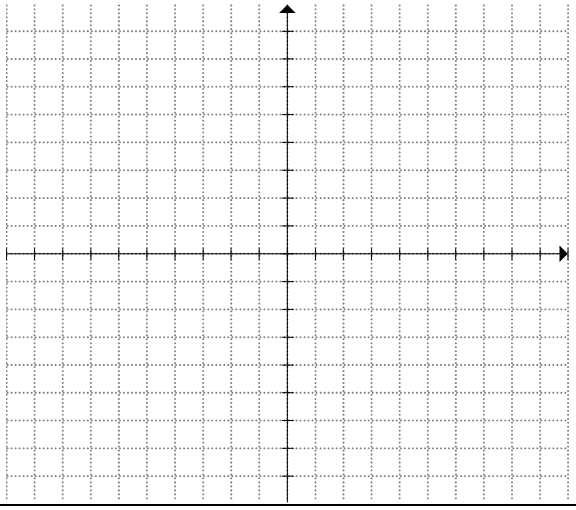
g) $\sqrt{x}=x+3$	h) $\sqrt{3x+1}=2x-6$	i) $3\sqrt{3x+1}=-(x+5)$

6. Graph the system with the left side as Y1 & right side as Y2. Solve the system by finding all intersection points

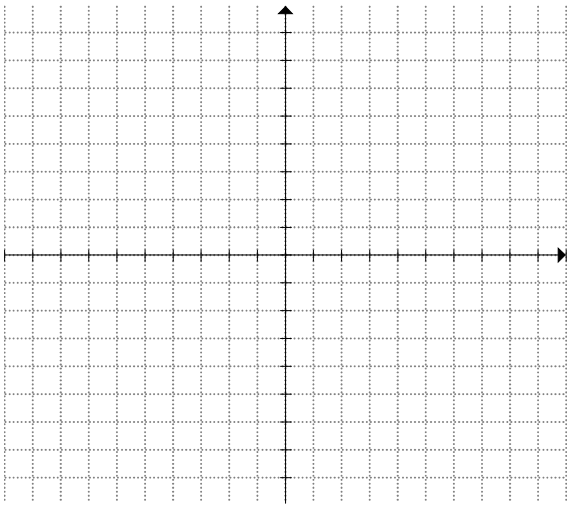
a) $\sqrt{x+5}=-x-5$



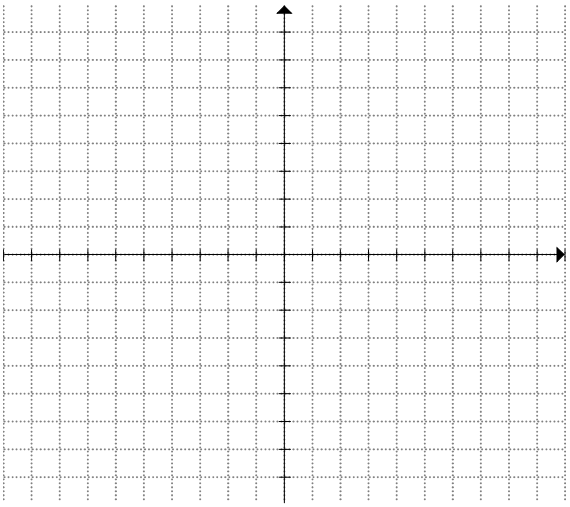
b) $\sqrt{3x+1}=x-9$



c) $\sqrt{-x}=\dfrac{x}{x+2}$



d) $\sqrt{\dfrac{37}{2}\left(\dfrac{x}{3}+1\right)}=\dfrac{1}{(x+2)^2}$



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7. Solve each of the following equations. Indicate an extraneous roots:

a) $\sqrt{x+2}=\frac{1}{\sqrt{x+2}}$	b) $\sqrt{x^2-8}=\sqrt{3x+2}$
c) $\sqrt{x^2+3}=x+1$	d) $\sqrt{x-2}=4-x$
e) $\sqrt{2x+3}-\sqrt{x+2}=2$	f) $\sqrt{x-8}+\sqrt{x}=2$

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g) $\sqrt{x}+\sqrt{x-3}=9$	h) $\sqrt{x-2}+\sqrt{3x-3}=3$
i) $\sqrt{x+6}=\frac{2}{\sqrt{x+1}}+\sqrt{x+1}$	f) $\frac{3}{\sqrt{x}}-5=\frac{1-2\sqrt{x}}{\sqrt{x}}$

8. Solve for all real value(s) of "x" $\sqrt{x+10}-\frac{6}{\sqrt{x+10}}=5$

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9. Find all "z" such that $\sqrt{5z+5}-\sqrt{3-3z}-2\sqrt{z}=0$

10. It so happens that $\sqrt{1800}+\sqrt{200}=\sqrt{n}$, where "n" is an integer. What is the value of "n"?

11. Find all real values of "x" which satisfy $\sqrt{x^2+1}+x^2+1=90$

12. Find $2x+5$ if "x" satisfies $\sqrt{40-9x}-2\sqrt{7-x}=\sqrt{-x}$

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13. Evaluate the expression. No Calculator: $\sqrt{3+2\sqrt{2}}-\sqrt{3-2\sqrt{2}}=?$

14. Solve for "x" $\sqrt{x+\sqrt{x+11}}+\sqrt{x-\sqrt{x+11}}=4$

15. Determine the sum of the solution for "x": $\sqrt{2x-7}=2+\sqrt{x-7}$

16. Determine the domain of the following function: $y=\sqrt{190-\sqrt{x}}$

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17. For how many real values of "x" is $\sqrt{2211-\sqrt{x}}$ an integer?

18. Given the two expressions, determine which one is bigger. Provide a proof to justify your answer:

$\sqrt[n]{n!}$ vs $\sqrt[n+1]{(n+1)!}$

19. If $\sqrt{\frac{3}{1}\times\frac{5}{3}\times\frac{7}{5}\times....\times\frac{2n+1}{2n-1}}=9$, then what is the value of "n"? Fermat #21

20. What are all real values of "x" which satisfy:

$\sqrt{x+2\sqrt{x-1}}+\sqrt{x-2\sqrt{x-1}}=2\sqrt{x-1}$?

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21. IF $S=\sqrt{\frac{a}{b}}$, where “a” and “b” are both primes, find $a+b$ =??

$$\text{Let } S=\sqrt{9-\sqrt{\frac{13}{9}+\sqrt{\frac{13}{81}-\sqrt{\frac{13}{6561}+\sqrt{\frac{13}{43046721}}}}}}-\ldots\ldots\ldots$$

22. A student mistakenly thinks that the equation below is correct: $\sqrt{a^2+b^2}=\sqrt{a^2}+\sqrt{b^2}$

Find as many ordered pairs of integers (a,b) such that $-10\le a\le 10$ and $-10\le b\le 10$, and that satisfies the equation: $\sqrt{a^2+b^2}=\sqrt{a^2}+\sqrt{b^2}$: Brilliant.org

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