Starter

Get out your 3.4 packet and make sure #4-20 from your "Ready, Set, Go" homework are finished. We will go over any questions you have, and will be turning it in soon!

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1. $x^2 + 3x + 2 = 0$

   a = 1

   b = 3

   c = 2

2. $2x^2 + 3x + 1 = 0$

   a = 2

   b = 3

   c = 1

3. $x^2 - 4x - 12 = 0$

   a = 1

   b = -4

   c = -12

Write each of the quadratic expressions in factored form.

4. $x^2 + 3x + 2$

5. $2x^2 + 3x + 1$

6. $x^2 - 4x - 12$

7. $x^2 - 3x + 2$

8. $x^2 - 5x - 6$

   $(x-6)(x+1)$ -6   -6, 1, -5

9. $x^2 - 4x + 4$

10. $x^2 + 8x - 20 =$

   $(x-2)(x+10)$ -20, -2, 10, 8

11. $x^2 + x - 12$

12. $x^2 - 7x + 12$

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$2x^2 + 3x + 1$

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

$2x(x+1) + 1(x+1)$

ac: 2, 2, 1, 3, b

factored form $(x+1)(2x+1)$

$2x + 1 = 0$

$\quad\;\; -1 \quad -1$

$\frac{2x}{2} = \frac{-1}{2}$

$x = -\frac{1}{2}$

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13.	$\sqrt[3]{5^2}$	
14.	$\sqrt[4]{16^3} = \sqrt[4]{(2^4)^3} = \sqrt[4]{2^{12}}$	$16^{\frac{3}{4}}$
15.	$\sqrt[3]{5^7 \cdot 3^5}$	
16.	$\sqrt[3]{9^2 \cdot 9^4}$	$9^{\frac{2}{3}} \cdot 9^{\frac{4}{3}}$
17.	$\sqrt[5]{x^{13}y^{21}}$	
18.	$\sqrt[3]{27a^5b^2}$	$(3^3a^5b^2)^{1/3} = 3a^{5/3}b^{2/3}$
19.	$\sqrt[5]{\dfrac{32x^{13}}{243y^{15}}}$	
20.		$9^{\frac{3}{2}}s^{\frac{6}{3}}t^{\frac{1}{2}}$

8.50 x 11.00 in

$$\sqrt{x^1} = x^{1/2}$$

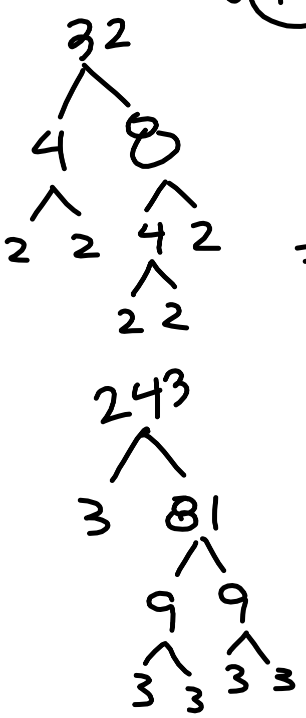
$$\sqrt[3]{x^1} = x^{1/3}$$

$$\sqrt[4]{x^1} = x^{1/4}$$

$$\sqrt[5]{x^1} = x^{1/5}$$

$$\sqrt[6]{x^1} = x^{1/6}$$

$$\sqrt[4]{x^3} = x^{3/4}$$



19) $\sqrt[5]{\dfrac{32x^{13}}{243y^{15}}} = \sqrt[5]{\dfrac{2^5x^{13}}{3^5y^{15}}} = \dfrac{\sqrt[5]{2^5}\cdot\sqrt[5]{x^{13}}}{\sqrt[5]{3^5}\cdot\sqrt[5]{y^{15}}} = \boxed{\dfrac{2x^2\cdot x^{3/5}}{3y^3}}$

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$\sqrt[3]{\frac{16xy^5}{x^7y^2}}$	Tia's method	
	Tehani's method	

Tia and Tehani continue to use their preferred notation when solving equations.

For example, Tia might solve the equation $(x+4)^3 = 27$ as follows:

$$(x+4)^3 = 27$$
$$\sqrt[3]{(x+4)^3} = \sqrt[3]{27} = \sqrt[3]{3^3}$$
$$x+4 = 3$$
$$x = -1$$

Tehani might solve the same equation as follows:

$$(x+4)^3 = 27$$
$$\left[(x+4)^3\right]^{1/3} = 27^{1/3} = (3^3)^{1/3}$$
$$x+4 = 3$$
$$x = -1$$

For each of the following problems, simplify the expression in the ways you think Tia and Tehani might do it.

Original equation	What Tia and Tehani might do to solve the equation:
$(x-2)^2-50=0$ $\sqrt{(x-2)^2}=\sqrt{50}$	Tia's method
	~~Tehani's~~ method

$$x-2=\pm\sqrt{5^2}\cdot\sqrt{2}$$
$$x-2=\pm 5\sqrt{2}$$
$$+2 \quad +2$$
$$x=2\pm 5\sqrt{2}$$
$$2+5\sqrt{2} \text{ and } 2-5\sqrt{2}$$
$$9.07 \text{ and } -5.07$$
$$\boxed{x=-5.07, 9.07}$$

50 → 25, 2 → 5, 5

$$5^2\cdot 2$$

Original equation	What Tia and Tehani might do to solve the equation:
$\frac{\cancel{9}(x-3)^2}{\cancel{9}}=\frac{4}{9}$	~~Tia's method~~ $\sqrt{(x-3)^2}=\sqrt{\frac{4}{9}}$ $x-3=\pm\frac{2}{3}$ $+3 \quad +3$ $x=3\pm\frac{2}{3}$ $3+\frac{2}{3}$ & $3-\frac{2}{3}$ $3\frac{2}{3}$ & $2\frac{1}{3}$ $\boxed{x=2\frac{1}{3}, 3\frac{2}{3}}$
	Tehani's method

Zac is showing off his new graphing calculator to Tia and Tehani. He is particularly excited about how his calculator will help him visualize the solutions to equations.

"Look," Zac says. "I treat the equation like a system of two equations. I set the expression on the left equal to y_1 and the expression of the right equal to y_2, and I know at the x value where the graphs intersect the expressions are equal to each other."

Zac shows off his new method on both of the equations Tia and Tehani solved using the properties of radicals and exponents. To everyone's surprise, both equations have a second solution.

1. Use Zac's graphical method to show that both of these equations have two solutions. Determine the exact values of the solutions you find on the calculator that Tia and Tehani did not find using their algebraic methods.

Tia and Tehani are surprised when they realize that both of these equations have more than one answer.

2. Explain why there is a second solution to each of these problems.

3. Modify Tia's and Tehani's algebraic approaches so they will find both solutions.

4. Use Zac's graphing calculator approach to solve the following problem.

   Carlos and Clarita deposited $300 in an account earning 5% interest. They want to take the money out of the account when it has doubled in value. To the nearest month, when can they withdraw their money?

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

3.7 Perfecting My Quads

A Practice Understanding Task

Carlos and Clarita, Tia and Tehani, and their best friend Zac are all discussing their favorite methods for solving quadratic equations of the form $ax^2+bx+c=0$. Each student thinks about the related quadratic function $y=ax^2+bx+c$ as part of his or her strategy.

Carlos: "I like to make a table of values for *x* and find the solutions by inspecting the table."

Clarita: "I like to write the equation in factored form, and then use the factors to find the solutions."

Tia: "I like to treat it like a quadratic function that I am trying to put in vertex form by completing the square. I can then use a square root to undo the squared expression."

☆ Tehani: "I also like to treat it like a quadratic function, but I use the quadratic formula to find the solutions."

Zac: "I like to graph the related quadratic function and use my graph to find the solutions."

Demonstrate how each student might solve each of the following quadratic equations.

Solve: $x^2-2x-15=0$ a= 1 b= -2 c= -15	Carlos' Strategy	Zac's Strategy
Clarita's Strategy	Tia's Strategy	Tehani's Strategy $x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$ $x = \frac{-(-2) \pm \sqrt{(-2)^2-4\cdot 1\cdot -15}}{2\cdot 1}$

$x = \frac{2 \pm \sqrt{4+60}}{2}$

$x = \frac{2 \pm \sqrt{64}}{2} = \frac{2 \pm 8}{2}$

$\frac{2+8}{2} = 5 \quad \frac{2-8}{2} = -3$

$x = -3, 5$

Solve: $2x^2+5x-12=0$ $a=2$ $b=5$ $c=-12$	Carlos' Strategy	Zac's Strategy
Clarita's Strategy	Tia's Strategy	Tehani's Strategy

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

$$x=\frac{-5\pm\sqrt{5^2-4\cdot2\cdot{-12}}}{2\cdot2}$$

$$x=\frac{-5\pm\sqrt{25+96}}{4}$$

$$x=\frac{-5\pm\sqrt{121}}{4}$$

$$x=\frac{-5\pm11}{4}$$

$$\frac{-5+11}{4}=\frac{6}{4}=\frac{3}{2} \qquad \frac{-5-11}{4}=\frac{-16}{4}=-4$$

$$\boxed{x=-4,\frac{3}{2}}$$

Solve: $x^2+4x-8=0$ $a=1$ $b=4$ $c=-8$	Carlos' Strategy	Zac's Strategy
Clarita's Strategy	Tia's Strategy	Tehani's Strategy $x=\frac{-4\pm\sqrt{(-4)^2-4\cdot1\cdot{-8}}}{2\cdot1}$

Solve: $8x^2+2x=3$ $-3 \quad -3$ $8x^2+2x-3=0$ finish & #5-10 pg 47	Carlos' Strategy	Zac's Strategy
Clarita's Strategy	Tia's Strategy	Tehani's Strategy

Describe why each strategy works.

As the students continue to try out their strategies, they notice that sometimes one strategy works better than another. Explain how you would decide when to use each strategy.

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Here is an extra challenge. How might each student solve the following system of equations?

Solve the system: $y_1 = x^2 - 4x + 1$ $y_2 = x - 3$	Carlos' Strategy	Zac's Strategy
Clarita's Strategy	Tia's Strategy	Tehani's Strategy

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Homework

Finish 3.4 "Ready, Set, Go"