

NAME *Stu Dent*
Adv Geo - *8*

Objectives

- X* Simplify radicals
- X* Solve Quadratic Equations
 - o Method 1: Solve for x
 - o Method 2: Factoring
 - o Method 3: Factoring by grouping
 - o Method 4: Area model
- Review of Pythagorean Theorem and radicals (below)

Class Examples

Problem 1 Simplify $\sqrt{48}$.

Solution

$$\begin{aligned}\sqrt{48} &= \sqrt{16 \cdot 3} \quad (16 \text{ is a perfect square.}) \\ &= \sqrt{16} \cdot \sqrt{3} \\ &= 4\sqrt{3}\end{aligned}$$

Problem 2 Simplify $\sqrt{18} + \sqrt{32} + \sqrt{75}$.

Solution

$$\begin{aligned}\sqrt{18} + \sqrt{32} + \sqrt{75} &= \sqrt{9 \cdot 2} + \sqrt{16 \cdot 2} + \sqrt{25 \cdot 3} \\ &= 3\sqrt{2} + 4\sqrt{2} + 5\sqrt{3} \\ &= 5\sqrt{3} + 7\sqrt{2}\end{aligned}$$

Problem 3 Simplify $\sqrt{\frac{5}{3}}$ *← don't let radicals hang in your basement*

Solution

$$\begin{aligned}\sqrt{\frac{5}{3}} &= \frac{\sqrt{5}}{\sqrt{3}} \quad \text{rationalize denominator} \\ &= \frac{\sqrt{5}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} \\ &= \frac{\sqrt{15}}{3} \text{ or } \frac{1}{3}\sqrt{15} \quad (\text{The two answers are equivalent simplifications.})\end{aligned}$$

Problem 4. Simplify $\sqrt{98} = \sqrt{49 \cdot 2} = \pm 7\sqrt{2}$

Problem 5. Simplify $\sqrt{200} = \sqrt{100 \cdot 2} = \pm 10\sqrt{2}$

Problem 6. Simplify $\sqrt{4+9} = \sqrt{13}$

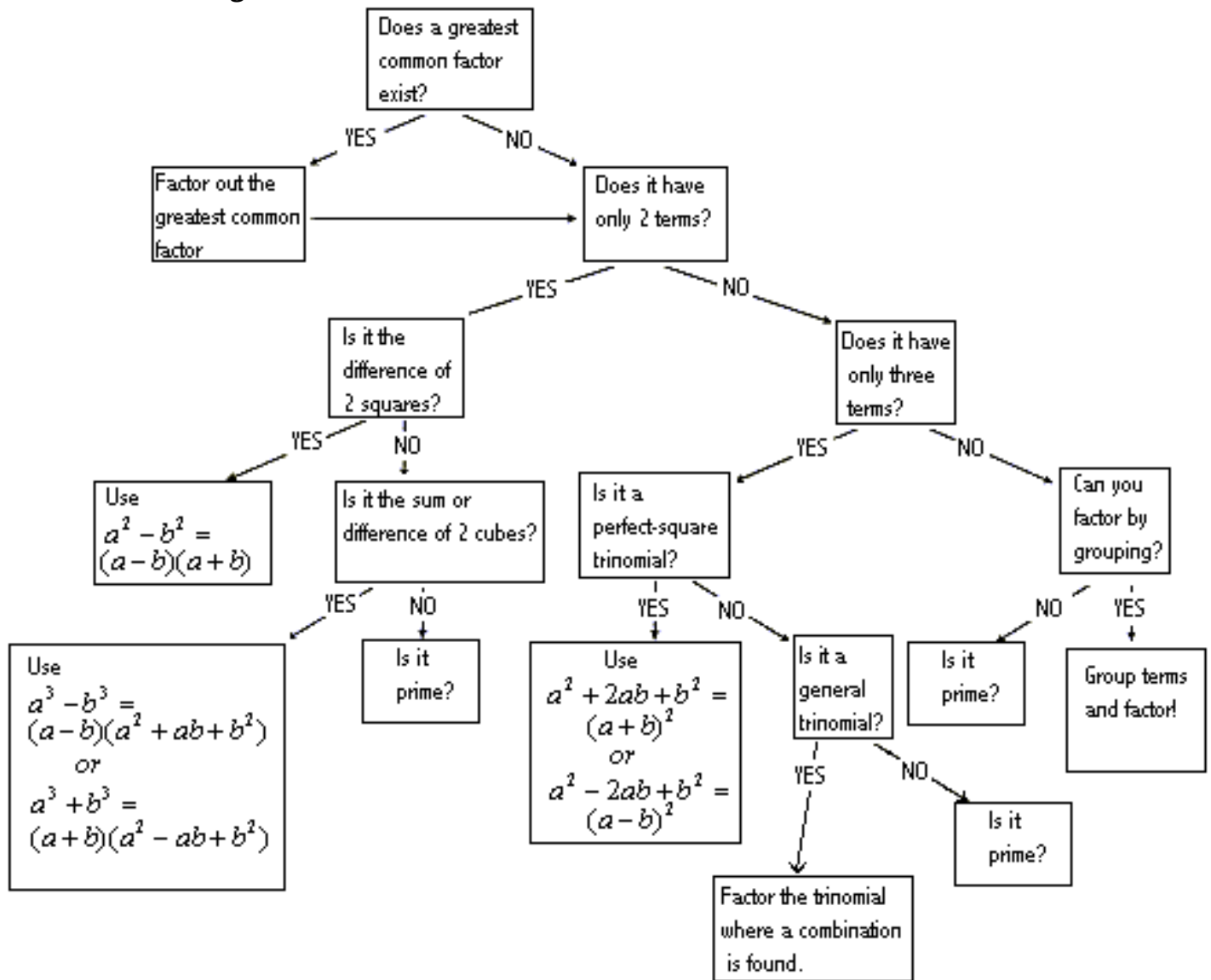
Problem 7. Simplify $\sqrt{4 \cdot 9} = 2 \cdot 3 = \pm 6$

Problem 8. Simplify $\sqrt{9+16} = \sqrt{25} = \pm 5$

Problem 9. Simplify $\frac{9}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3}} = \frac{9\sqrt{3}}{\sqrt{9}} = \frac{9\sqrt{3}}{3} = \pm 3\sqrt{3}$

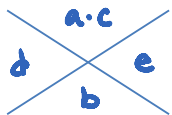
Problem 10. Simplify $7\sqrt{5} + \sqrt{7} + 6\sqrt{5} + \sqrt{7}$
 $13\sqrt{5} + 2\sqrt{7}$

Method 1: Factoring Flowchart



Method 4: An area model

$$0 = ax^2 + bx + c$$



ax^2	d
e	c

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9.1 Review of Radicals and Quadratic Equations

Ms. Kresovic

Monday 24 February 2014

Solving Quadratics:

You may use any method that you are comfortable with, and that allows you to be successful.

You are in a unique position as I will survey you at the end of this class and after your homework about these methods. This information will be shared with the department at our meeting this Thursday.



Problem 11. Solve $x^2 + 9 = 25$

$$x^2 = 16$$

$$x = \pm 4$$

Problem 12. $x^2 + 13x + 42$

Simplify (not solve $\therefore$ no =)

2: Trad or Flowchart

$$x^2 + 13x + 42$$

$$(x + 6)(x + 7)$$

3: Grouping

$$x^2 + 13x + 42$$

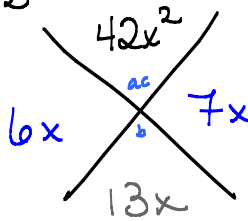
$$\underline{x^2 + \underbrace{6x + 7x}_{\substack{x \quad 7}} + 42}$$

$$x(x + 6) + 7(x + 6)$$

$$(x + 6)(x + 7)$$

4: Quad Model

$$x^2 + 13x + 42$$



	x	7	
x	x^2	$7x$	
6	$6x$	42	

$$\rightarrow (x + 7)(x + 6)$$

Problem 13. $y^2 - 15y + 54$

Flowchart

2: $y^2 - 15y + 54$

$(y - 9)(y - 6)$

3. Group

$y^2 - 15y + 54$

$\frac{y^2 - 9y - 6y + 54}{y \quad -6}$

$y(y - 9) \quad -6(y - 9)$

$(y - 9)(y - 6)$

Skipped area by request

Problem 14. $z^2 - 3z - 28$

$$(z - 7)(z + 4)$$

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Problem 15. $-20n^2 + 9n + 20$

$$-1(20n^2 - 9n - 20)$$

$$-1(5n + 4)(4n - 5)$$

$$\begin{array}{r} 1 \quad 20 \\ 2 \quad 10 \\ \hline 4 \quad 5 \end{array}$$

Shipped Groups

Area Model: $-1(20n^2 - 9n - 20)$

$-400n^2$
 $-25n$ $+16n$
 $-9n$

	$4n$	-5
$5n$	$20n^2$	$-25n$
4	$16n$	-20

$(4n - 5)(5n + 4)$

Problem 16. Solve $(3\sqrt{5})^2 + (3\sqrt{2})^2 = x^2$ for x .

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

Commutative $3 \cdot 3 \cdot \sqrt{5} \cdot \sqrt{5} = x^2$

$$9 \cdot 5 + 9 \cdot 2 = x^2$$

MULT. OUT

$$45 + 18 = x^2$$

$$63 = x^2$$

$$9 \cdot 7 = x^2$$

$$\pm 3\sqrt{7} = x$$

FACTOR

$$9(5+2) = x^2$$

$$9 \cdot 7 = x^2$$

$$\pm 3\sqrt{7} = x$$

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9.1 Review of Radicals and Quadratic Equations

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Problem 17. Solve for x. a $x^2 - 10x = -16$
+16 +16

$$\begin{aligned} x^2 - 10x + 16 &= 0 \\ (x - 8)(x - 2) &= 0 \\ \text{mult prop zero} \\ x - 8 = 0 \quad \& \quad x - 2 = 0 \\ x = 8 \quad x &= 2 \end{aligned}$$

b $x^2 + 5x = 0$

$$\begin{aligned} x(x + 5) &= 0 \\ \downarrow \quad x + 5 &= 0 \\ x = 0 \quad \text{or} \quad x &= -5 \end{aligned}$$

Homework

1 Simplify.

a $\sqrt{4}$

b $\sqrt{27}$

c $\sqrt{72}$

d $\sqrt{32}$

e $\sqrt{98}$

f $\sqrt{200}$

g $\sqrt{20}$

h $\sqrt{24}$

2 Simplify.

a $5\sqrt{18}$

b $\sqrt{4 + 9}$

c $\sqrt{3^2 + 4^2}$

d $\sqrt{5^2 + 12^2}$

e $\frac{1}{6}\sqrt{48}$

f $\sqrt{49 \cdot 3}$

3 Simplify.

a $\frac{1}{\sqrt{2}}$

b $\frac{1}{\sqrt{5}}$

c $\frac{4}{\sqrt{2}}$

d $\frac{6}{\sqrt{3}}$

4 Simplify.

a $4\sqrt{3} + 7\sqrt{3}$

b $7\sqrt{2} + \sqrt{3} + 6\sqrt{3} + \sqrt{2}$

c $\sqrt{12} + \sqrt{27}$

d $\sqrt{72} + \sqrt{75} - \sqrt{48}$

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5 Solve for x.

a $x^2 = 25$

b $x^2 = 144$

c $x^2 = 169$

d $x^2 = \frac{1}{4}$

e $x^2 = 12$

f $x^2 = 18$

6 Solve for x.

a $x^2 + 16 = 25$

b $x^2 + 6^2 = 100$

c $12^2 + x^2 = 13^2$

d $x^2 + (3\sqrt{3})^2 = 36$

e $(\sqrt{5})^2 + (\sqrt{11})^2 = x^2$

f $x^2 = (5\sqrt{3})^2 + (\sqrt{5})^2$

7 Solve for x.

a $x^2 - 5x - 6 = 0$

b $x^2 + 4x - 12 = 0$

c $x^2 - 8x + 15 = 0$

d $x^2 - 18 - 3x = 0$

e $x^2 - 36 = 9x$

f $-x^2 + 5x + 36 = 0$

8 Solve for x.

a $x^2 - 4x = 0$

b $x^2 = 10x$

c $x^2 - 2x = 11x$

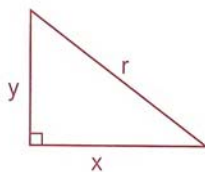
d $5x = x^2 - 3x$

9 If, in the given figure, $x^2 + y^2 = r^2$,

a Find x if $y = 21$ and $r = 29$

b Find y, in simplified radical form, if $x = 2$ and $r = 4$

c Find r to the nearest tenth if $x = 4.1$



10 Solve for x .

a $3x^2 + 5x - 7 = x^2 + 8x + 28$

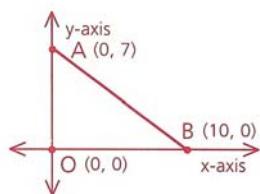
b $12x^2 - 15 = -11x$

c $8x^2 - 7x + 9 = 2x^2 + 6x + 7$

22.3

11 Solve $\frac{7}{x+1} = \frac{2x+4}{3x-3}$ for x .

12 Find AB



13 Simplify.

a $\sqrt{h^2}$, if h represents a negative number

b $\sqrt{(x-3)^2}$, if $x < 3$

c $\sqrt{p^2q^2}$, if p and q both represent negative numbers

d $\sqrt{x^3y^2}$, if $x > 0$ and $y < 0$