

Radicals And Rationalizing The Denominator

Name _____ Day 1

Date _____

Radical Review

$\sqrt{4} =$

$\sqrt{9} =$

$\sqrt{16} =$

$\sqrt{25} =$

$\sqrt{36} =$

$\sqrt{49} =$

$\sqrt{64} =$

$\sqrt{81} =$

$\sqrt{100} =$

$\sqrt{121} =$

$\sqrt{144} =$

EXPRESS EACH IN SIMPLEST FORM

1) $\sqrt{12}$

2) $\sqrt{20}$

3) $\sqrt{28}$

4) $\sqrt{45}$

5) $\sqrt{18}$

6) $\sqrt{8}$

7) $\sqrt{24}$

8) $\sqrt{50}$

9) $\sqrt{75}$

10) $\sqrt{63}$

11) $\sqrt{72}$

12) $\sqrt{48}$

13) $\sqrt{98}$

14) $\sqrt{80}$

15) $\sqrt{252}$

EXPRESS EACH IN SIMPLEST FORM

16) $3\sqrt{12}$

17) $5\sqrt{18}$

18) $4\sqrt{20}$

19) $3\sqrt{28}$

20) $2\sqrt{45}$

21) $4\sqrt{27}$

Name _____

Date _____

Radical Day 2

SIMPLIFY:

1) $\sqrt{27}$

2) $\sqrt{18}$

3) $\sqrt{75}$

4) $\sqrt{108}$

5) $3\sqrt{8}$

6) $5\sqrt{12}$

7) $7\sqrt{20}$

8) $2\sqrt{28}$

9) $\sqrt{8} \cdot \sqrt{8}$

10) $\sqrt{12} \cdot \sqrt{3}$

11) $\sqrt{6} \cdot \sqrt{8}$

12) $2\sqrt{5} \cdot 3\sqrt{5}$

13) $3\sqrt{12} \cdot 2\sqrt{3}$

14) $3\sqrt{10} \cdot 2\sqrt{2}$

15) $(\sqrt{3})^2$

16) $(\sqrt{7})^2$

17) $(3\sqrt{5})^2$

18) $(5\sqrt{3})^2$

19) $\sqrt{8} + \sqrt{50}$

20) $\sqrt{27} + \sqrt{48}$

21) $\sqrt{75} - \sqrt{12}$

22) $3\sqrt{20} + 2\sqrt{45}$

23) $7\sqrt{24} - 2\sqrt{54}$

24) $2\sqrt{72} + 5\sqrt{32}$

25) $3\sqrt{80} + 2\sqrt{500} + 3\sqrt{180} - 5\sqrt{125}$

Name _____

Date _____

Day 2
Homework

1) $-4\sqrt{98}$

2) $\frac{1}{3}\sqrt{27}$

3) $\frac{1}{2}\sqrt{48}$

4) $-\frac{1}{3}\sqrt{50}$

5) $\frac{3}{4}\sqrt{80}$

6) $-\frac{4}{5}\sqrt{150}$

7) $\sqrt{X^3}$

8) $\sqrt{X^2Y}$

9) $5\sqrt{RS^4}$

10) $\sqrt{5X^3Y}$

11) $3\sqrt{3X^2Y^5}$

12) $5\sqrt{9X^5Y^3}$

13) $6\sqrt{8X^3Y^5}$

14) $5\sqrt{\frac{49}{20}}$

15) $\sqrt{\frac{3}{4}}$

16) $2\sqrt{\frac{75}{64}}$

17) $\sqrt{\frac{7}{16}}$

Day 3

1) $\sqrt{128x^2}$

2) $\sqrt[3]{32x^5y^4}$

3) $a\sqrt{45} + \sqrt{20a^2} - 5\sqrt{2a}$

Sep 30-8:11 AM

3-5 Multiplying Radicals

$$\sqrt{a} \cdot \sqrt{b} = \sqrt{ab}$$

- 1) Multiply the terms in front of the radical.
- 2) Multiply the terms on the inside of the radical.
- 3) Put into simplest form.

$$\sqrt{\frac{1}{3}} \cdot \sqrt{24}$$

$$\sqrt{2} \cdot \sqrt{8}$$

$$(3\sqrt{3})^2$$

$$\sqrt[3]{8} \cdot \sqrt[3]{27}$$

$$\sqrt{48x^2} \cdot \sqrt{\frac{4}{3}}$$

Sep 30-8:22 AM

- 1) Multiply the terms in front of the radical.
- 2) Multiply the terms on the inside of the radical.
- 3) Put into simplest form.

Distribute:

$$\sqrt{3}(2 + \sqrt{3})$$

$$(2 + \sqrt{3})(1 + \sqrt{3})$$

FOIL:

$$(3 + \sqrt{2})(3 - \sqrt{2})$$

Sep 30-8:49 AM

Express each of the following products in simplest form:

$\sqrt{5}(\sqrt{10})$

$(3 + \sqrt{6a})(1 + \sqrt{2a})$

$(\sqrt{5} + \sqrt{7})(\sqrt{5} - \sqrt{7})$

Sep 30-8:51 AM

The length of a side, s , of an equilateral triangle is $\sqrt{3}$ inches and the length of the altitude, h , is $\sqrt{\frac{3}{4}}$ inches. Find the area of the triangle.

Sep 30-8:51 AM

Name: _____

Day 3 Homework

1) Simplify: $(4\sqrt{2})^2$

2) Simplify: $\sqrt{30} \cdot \sqrt{5}$

3) Simplify: $3\sqrt{27} \cdot 2\sqrt{3}$

4) Simplify: $\sqrt{6} \cdot \sqrt{3}$

5) Simplify: $\frac{2}{3}\sqrt{10} \cdot 6\sqrt{4}$

6) Simplify: $4\sqrt{3} \cdot 2\sqrt{8}$

7) Simplify: $\sqrt{3x} \cdot \sqrt{3x^3}$

8) Simplify: $\sqrt{3ac} \cdot \sqrt{12a^2c}$

9) Simplify: $\sqrt{4y} \cdot \sqrt{16y^3}$

14) Simplify: $(4\sqrt{2} - 6\sqrt{3})^2$

10) Simplify: $\sqrt{5x^3} \cdot \sqrt{4x^2}$

15) Simplify: $(2\sqrt{3} - 3\sqrt{2})^2$

11) Simplify completely: $2\sqrt{3}(3\sqrt{6} - 3\sqrt{3})$

16) Simplify: $(\sqrt{11} - \sqrt{5})(\sqrt{11} + \sqrt{5})$

12) Simplify: $-\sqrt{6}(2\sqrt{6} - 4\sqrt{2})$

17) Expand and simplify: $(\sqrt{2} + 5)(3\sqrt{2} - 4)$

13) Simplify: $2\sqrt{5}(4 - 3\sqrt{5})$

18) Expand and simplify: $(\sqrt{3} + 4)(2\sqrt{3} - 5)$

Name: _____
Day 4 Quiz Review

1) Simplify: $4\sqrt{18} + 3\sqrt{75} + 2\sqrt{45} - 2\sqrt{50}$

2) Combine and simplify: $\sqrt{24} - \frac{1}{3}\sqrt{54}$

3) Simplify: $2\sqrt{5}(4 - 3\sqrt{5})$

4) Simplify: $3\sqrt{27} \cdot 2\sqrt{3}$

5) Simplify: $\sqrt{18}$

6) Simplify: $(4\sqrt{2})^2$

7) Simplify: $\sqrt{96}$

8) Simplify: $(2\sqrt{3} - 3\sqrt{2})^2$

9) Simplify: $(\sqrt{7} - \sqrt{5})^2$

10) Simplify: $(\sqrt{11} - \sqrt{5})(\sqrt{11} + \sqrt{5})$

11) Simplify: $\sqrt{25y^8}$

12) Simplify: $3\sqrt{50} + 6\sqrt{12} - 2\sqrt{75} + 5\sqrt{20}$

13) Simplify: $6\sqrt{54} - 3\sqrt{24} - 8\sqrt{96}$

18) Simplify: $\sqrt{3}(\sqrt{12} - \sqrt{6})$

14) Simplify: $\sqrt{48} - \sqrt{27} + \sqrt{12}$

19) Simplify: $\frac{3}{4}\sqrt{80}$

15) Combine and simplify: $6\sqrt{20} - 2\sqrt{80}$

20) Combine and simplify: $4\sqrt{20} - 3\sqrt{45} + 3\sqrt{5}$

16) Combine and simplify: $\sqrt{24} - \sqrt{54}$

21) Simplify: $4\sqrt{12} + 3\sqrt{48}$

17) Simplify completely: $2\sqrt{3}(3\sqrt{6} - 3\sqrt{3})$

Day 6

1) $(2 + \sqrt{6})(2 - \sqrt{6})$

2) $\sqrt{45} - \sqrt{20}$

3) $3\sqrt{12} + 5\sqrt{27}$

4) $\sqrt{8b^3} + \sqrt{50b^3}$

Oct 5-8:29 AM

Rationalizing a Denominator

To rationalize the denominator of a fraction means to write the fraction as an equivalent fraction with a denominator that is a rational number.

Rationalize:

$$\sqrt{\frac{5}{2}}$$

Oct 5-8:34 AM

The binomials $(a + b)$ and $(a - b)$ are called conjugates.

Rationalize:

$$\frac{3}{2 + \sqrt{6}}$$

What is the conjugate?

To Rationalize:

- 1) Find the conjugate of the denominator.
- 2) Multiply the numerator and denominator by the conjugate.
- 3) Simplify the expression.

Oct 5-8:40 AM

[illegible]

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[illegible]

Name _____

Date _____

Day 6 Homework

1) $\frac{9}{\sqrt{2}}$

2) $\frac{1}{\sqrt{7}}$

3) $\frac{3}{\sqrt{6}+2}$

4) $\frac{18}{\sqrt{3}-3}$

5) $\frac{12}{\sqrt{5}-2}$

6) $\frac{12}{3-\sqrt{5}}$

7) $\frac{44}{2\sqrt{5}-3}$

8) $\frac{22}{2\sqrt{3}+1}$

Name _____

Day 7

Date _____

$$1) \frac{9}{3-\sqrt{3}}$$

$$2) \frac{14}{2\sqrt{2}+1}$$

$$3) \frac{\sqrt{2}+4}{\sqrt{2}-1}$$

$$4) \frac{6+\sqrt{3}}{4-\sqrt{3}}$$

$$5) \frac{2\sqrt{3}-1}{2\sqrt{3}+1}$$

$$6) \frac{4-5\sqrt{2}}{7+3\sqrt{2}}$$

$$7) \frac{4-5\sqrt{2}}{7+3\sqrt{2}}$$

$$8) \frac{\sqrt{5}-\sqrt{3}}{\sqrt{5}-\sqrt{3}}$$

$$9) \frac{2\sqrt{5}+3\sqrt{2}}{3\sqrt{5}-\sqrt{2}}$$

$$10) \frac{\sqrt{10}-8}{4+\sqrt{10}}$$

Name: _____
Day 8

1) The expression $\frac{1}{2-\sqrt{3}}$ is equivalent to

- A) $\frac{2-\sqrt{3}}{-1}$ C) $2-\sqrt{3}$
B) $\frac{2+\sqrt{3}}{-1}$ D) $2+\sqrt{3}$

2) The expression $\frac{\sqrt{3}+1}{\sqrt{3}-1}$ is equivalent to

- A) $2+\sqrt{3}$ C) 2
B) $5+\sqrt{3}$ D) -1

3) The expression $\frac{\sqrt{3}+1}{\sqrt{3}-1}$ is equivalent to

- A) $5+\sqrt{3}$ C) 2
B) $2+\sqrt{3}$ D) -1

4) The expression $\frac{2+\sqrt{3}}{2-\sqrt{3}}$ equivalent to

- A) $\frac{7+4\sqrt{3}}{7}$ C) $7+4\sqrt{3}$
B) $11\sqrt{3}$ D) $7-4\sqrt{3}$

5) The expression $\frac{3+\sqrt{2}}{3-\sqrt{2}}$ is equivalent to

- A) $\frac{11}{7}$ C) $\frac{7}{11+6\sqrt{2}}$
B) $\frac{11+6\sqrt{2}}{7}$ D) $\frac{11-6\sqrt{2}}{7}$

6) The expression $\frac{3+\sqrt{5}}{3-\sqrt{5}}$ is equivalent to

- A) $\frac{7+3\sqrt{5}}{7}$ C) $\frac{10\sqrt{5}}{7}$
B) $\frac{7}{2}$ D) $\frac{7+3\sqrt{5}}{2}$

7) Rationalize the denominator: $\frac{\sqrt{5}+\sqrt{3}}{\sqrt{5}-\sqrt{3}}$

- A) $4+\sqrt{15}$ C) $4-\sqrt{15}$
B) $8-4\sqrt{15}$ D) $8+4\sqrt{15}$

8) Rationalize the denominator: $\frac{\sqrt{3}-\sqrt{5}}{\sqrt{3}+\sqrt{5}}$

- A) $-4+2\sqrt{15}$ C) $-4+\sqrt{15}$
B) $4-\sqrt{15}$ D) $-4-2\sqrt{15}$

9) Simplify: $\frac{\sqrt{10} - 8}{4 + \sqrt{10}}$

A) $\frac{-2\sqrt{10} - 11}{7}$

B) $-\frac{\sqrt{10}}{2}$

C) $2\sqrt{10} - 7$

D) $5 - 4\sqrt{10}$

10) Simplify: $\frac{\sqrt{5} - 4}{2 + \sqrt{5}}$

A) $\frac{5 - 4\sqrt{5}}{7}$

B) $13 - 6\sqrt{5}$

C) $\frac{-2\sqrt{5} - 3}{9}$

D) $\frac{-3\sqrt{5}}{7}$

11) Simplify: $\frac{4\sqrt{7} + 3\sqrt{2}}{5\sqrt{2} + 2\sqrt{7}}$

A) $\frac{13 - 7\sqrt{14}}{11}$

B) $\frac{-13 + 7\sqrt{14}}{11}$

C) $-\frac{13 + 7\sqrt{14}}{11}$

D) $\frac{13 + 7\sqrt{14}}{11}$

12) $\frac{3\sqrt{3} - 1}{3\sqrt{3} + 1}$

13) $\frac{4\sqrt{2} + 1}{4\sqrt{2} - 1}$

14) $\frac{4 + \sqrt{5}}{3 - \sqrt{5}}$

15) $\frac{\sqrt{3} + 1}{\sqrt{3} - 2}$

Questions 12 through 15 refer to the following:

Rationalize the denominator and express in simplest form.

Day 9

$$\frac{2}{3 + \sqrt{5}}$$

$$\frac{6}{\sqrt{5} - \sqrt{2}}$$

$$\frac{\sqrt{2} - 1}{\sqrt{2} + 1}$$

Oct 7-8:40 AM

3-8 Solving Radical Equations

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

How are we going to get rid of the radical?

How would you make $\sqrt{3}$ a 3?

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

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

$$2x - 3 = 25$$

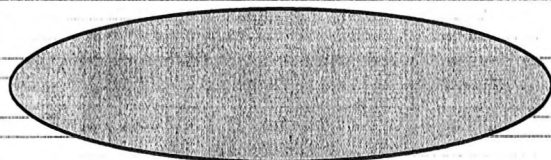
$$\begin{array}{r} +3 \quad +3 \\ \hline 2x - 3 = 25 \\ 2x \quad = 28 \\ \hline \frac{2x}{2} = \frac{28}{2} \\ x = 14 \end{array}$$

Oct 7-8:48 AM

To Solve a Radical Equation:

1. isolate the radical
2. square both sides
3. solve the equation
4. check in the original

$$\sqrt{2y - 1} + 7 = 4$$



Oct 7-9:38 AM

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

$$\sqrt{5+y} = 3$$

Oct 7-9:46 AM

$$x = \sqrt{6x+7}$$

$$x = 1 + \sqrt{x+5}$$

Oct 7-10:02 AM

Find the value of a such that $\sqrt[3]{4-2a} = -2$.

What is the solution set of $x = 1 + \sqrt{15-7x}$?

Oct 7-10:04 AM

Name _____

Date _____

Radical Equations Day 9
Homework

Rules:

- Isolate the radical so it is the only term on the side of the equation
- If the radical is a square root, square each side of the equation
- Solve
- Check

1) $\sqrt{X-2} = 5$

Check:

2) $\sqrt{3X-5} = 5$

Check:

3) $\sqrt{6X-2} = 4$

Check:

4) $\sqrt{2X+3} - 5 = 0$

Check:

5) $8 = 2 + \sqrt{2X-4}$

Check:

6) $\sqrt{2X-1} + 7 = 4$

Check:

7) $X = 1 + \sqrt{X+5}$

Check:

8) $\sqrt{30-2X} + 3 = X$

Check:

9) $X = 1 + \sqrt{X+5}$

Check:

10) $\sqrt{10-6X} + 3 = X$

Check:

Name _____ Day 10
Radical equations

Date _____

1) $\sqrt{X-1} = X-7$

Check:

2) $\sqrt{9X^2+4} = 3X+2$

Check:

3) $3 = X + \sqrt{2X-3}$.

Check:

4) $X-3 = \sqrt{30-2X}$

Check:

5) $X-1 = \sqrt{5X-9}$

Check:

$$6) \sqrt{5X+3} = \sqrt{3X+7}$$

Check:

$$7) \sqrt{X+5} = \sqrt{X^2-15}$$

Check:

$$8) \sqrt{X^2+8} = 2\sqrt{2X-1}$$

Check:

$$9) 2\sqrt{X+8} = 3\sqrt{X-2}$$

Check:

Name: _____
Day 11

1) The equation $x = \sqrt{3x + 4}$ has

- A) 4 and -1 as solutions
- B) no solutions
- C) 4 as its only solution
- D) -1 as its only solution

2) The solution set of the equation $\sqrt{2x + 15} = x$ is

- A) {5,-3} C) { }
- B) {5} D) {-3}

3) The solution set of the equation $\sqrt{x + 1} - 5 = 0$ is

- A) {0} C) {1}
- B) {-26} D) {24}

4) The solution set of $\sqrt{3x + 4} = x$ is

- A) {-4,1} C) {4}
- B) {4,-1} D) {-1}

5) What is the solution set for $\sqrt{x + 11} + 1 = x$?

- A) {-2} C) {5,-2}
- B) {5} D) { }

6) What is the solution set of the equation $\sqrt{5 - x} + 3 = x$?

- A) {4,1} C) { }
- B) {4} D) {1}

- 7) What is the solution set of the equation

$$\sqrt{x^2 - 3x + 3} = 1?$$

- A) {1} C) {1,2}
B) {} D) {2}

- 8) What is the solution set of the equation

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

- A) {3} C) {}
B) {0} D) {0,3}

- 9) For the equation $\sqrt{x + 21} = x + 1$, the solution set for x is

- A) {4} C) {}
B) {-5} D) {-5,4}

- 10) Solve: $4\sqrt{3b} = 8$

- 11) Solve: $2\sqrt{y + 2} - 4 = 8$

- 12) Solve by factoring: $\sqrt{3x^2 + x + 2} = \sqrt{2x^2 + 8}$

Name: _____

Date: _____

Review Day 12

Simplify:

1) $\sqrt{180}$

2) $\sqrt{147b^4}$

3) $\sqrt{80} + \sqrt{45}$

4) $-6\sqrt{50} + 4\sqrt{98}$

5) $2\sqrt{6}(3\sqrt{6})$

6) $\sqrt{2}(\sqrt{18} - \sqrt{8})$

7) $3\sqrt{2}(3 + \sqrt{2})$

8) $(5 + \sqrt{2})^2$

Rationalize the denominator:

9) $\frac{5\sqrt{5}}{15\sqrt{2}}$

10) $\frac{7 + \sqrt{5}}{7 - \sqrt{5}}$

Solve:

11) $3 - \sqrt{2x + 5} = 0$

12) $2x = 2\sqrt{3x - 2}$

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