1. Simplify $\sqrt[3]{-162}$

2. Solve $9x^2 - 6x + 1 = 0$ by factoring

3. Solve $2x^2 + 1 = 5 - 7x$ using the quadratic formula

4. Solve $3x^2 - 5x + 9 = 8$ by graphing

Objectives   Solve equations containing radical expressions

Recognize when extraneous solutions may arise when solving radical equations and check solutions to determine which solutions may be extraneous.

QUIZ TODAY

Homework   6-5 Worksheet, 1-21 odd

Exercises

What value completes the square for each expression?

1. $x^2 + 2x$ **1**

2. $x^2 - 24x$ **144**

3. $x^2 + 12x$ **36**

4. $x^2 - 20x$ **100**

5. $x^2 + 5x$ $\frac{25}{4}$

6. $x^2 - 9x$ $\frac{81}{4}$

7. $2x^2 - 24x$ **72**

8. $3x^2 + 12x$ **12**

9. $-x^2 + 6x$ **−9**

10. $5x^2 + 80x$ **320**

11. $-7x^2 + 14x$ **−7**

12. $-3x^2 - 15x$ $-\frac{75}{4}$

Exercises

Rewrite each equation in vertex form.

13. $y = x^2 + 4x + 3$ $(x + 2)^2 - 1$

14. $y = x^2 - 6x + 13$ $(x - 3)^2 + 4$

15. $y = -x^2 + 4x - 10$ $-(x - 2)^2 - 6$

16. $y = x^2 - 2x - 3$ $(x - 1)^2 - 4$

17. $y = x^2 + 8x + 13$ $(x + 4)^2 - 3$

18. $y = -x^2 - 6x - 4$ $-(x + 3)^2 + 5$

19. $y = -x^2 + 10x - 18$ $-(x - 5)^2 + 7$

20. $y = x^2 + 2x - 8$ $(x + 1)^2 - 9$

21. $y = 2x^2 + 4x - 3$ $2(x + 1)^2 - 5$

22. $y = 3x^2 - 12x + 8$ $3(x - 2)^2 - 4$

Let's get the quiz out of the way.

Put your homework packets on your desk, I will check them while you take the quiz.

What is a Radical Equation?

An equation that has a variable in a radicand or a variable with a rational exponent.

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

Three basic step…

$$3 + \sqrt{2x - 3} = 8$$
$$\underline{-3 \qquad\qquad\quad -3}$$

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

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

$$2x - 3 = 25$$
$$\underline{+3 \quad +3}$$

$$2x = 28$$

$$\frac{2x}{2} = \frac{28}{2}$$

$$x = 14$$

1. Isolate the radical expression

2. Square both sides

3. Solve for x

Do problems 2, and 4 on worksheet 6-5. page 49.

2.)   4.)

It can get a little complicated. Sometimes we cause **extraneous** solutions to appear when we solve radical equations.

So what do we mean by extraneous solutions...

ex·tra·ne·ous 🔊 [ik-**strey**-nee-*uh* s] ? ~~Show IPA~~

adjective

1. introduced or coming from without; not belonging or proper to a thing; external; foreign: *extraneous substances in our water.*

2. not pertinent; irrelevant: *an extraneous remark; extraneous decoration.*

Origin:

1630–40; < Latin *extrāneus* external, foreign, equivalent to *extr(a)*- extra- + -*ān(us)* -an + -*eus* -eous

What is the solution of $\sqrt{x + 7} - 5 = x$? Check your results.

$\sqrt{x + 7} - 5 = x$

Isolate the radical.

Square each side.

Simplify.

Combine like terms.

Factor.

Zero-Product Property

To check our answers we substitute them back into the <u>original</u> equation and see if they produce a true statement.

Check

$$\sqrt{x+7} - 5 = x$$

$$\sqrt{-3+7} - 5 \stackrel{?}{=} -3$$

$$\sqrt{x+7} - 5 = x$$

$$\sqrt{-6+7} - 5 \stackrel{?}{=} -6$$

?

Remember !!

Whenever we square both sides of an equation to solve, we may be introducing **extraneous** solutions into the equation.

When checking your solutions, use the **original** when substituting values.

What if you have more than one radical in the equation?

What is the solution of $\sqrt{2x + 1} - \sqrt{x} = 1$?

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

Isolate the more complicated radical.

Square each side.

Isolate $2\sqrt{x}$.

Square each side.

Subtract $4x$ from each side.

Factor.

Zero-Product Property

Check

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

$$\sqrt{2(0) + 1} - \sqrt{0} \stackrel{?}{=} 1$$

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

$$\sqrt{2(4) + 1} - \sqrt{4} \stackrel{?}{=} 1$$

?

What if you have to solve an equation like the following?

$$(x + 6i)(2 + i) = 14 + 22i$$

Expand the left side. (FOIL)

Simplify (use i^2=-1)

Group real and imaginary terms

Set Corresponding Parts Equal

Solve each part for x

Now you try. Solve for x

$$(3 + 2i)(1 - xi) = 9 - 7i$$

Expand the left side. (FOIL)

Simplify (use i^2=-1)

Group real and imaginary terms

Set Corresponding Parts Equal

Solve each part for x

Work on your homework.