

Good morning!

1. "Here"
2. Go over homework
3. Notes on Solving by Square Root Method
4. Practice p. 10-12; homework is on DeltaMath:)
5. Quiz over Solving by Factoring and SRM

Perfect Square	1	4	9	16	25	36	49	64	81	100	121	144	169
$\sqrt{\quad}$	1	2	3	4	5	6	7	8	9	10	11	12	13

Simplify each radical expression, if possible. Find the correct answer below.
Write the letters in the boxes below to answer the riddle.

1) $\sqrt{100}$	2) $\sqrt{24}$	3) $\sqrt{18}$	4) $\sqrt{4}$
5) $\sqrt{7}$	6) $\sqrt{98}$	7) $\sqrt{16}$	8) $\sqrt{8}$
9) $\sqrt{20}$	10) $\sqrt{63}$	11) $\sqrt{32}$	12) $\sqrt{12}$
13) $\sqrt{121}$	14) $\sqrt{45}$	15) $\sqrt{48}$	16) $\sqrt{10}$
17) $\sqrt{50}$	18) $\sqrt{72}$	19) $\sqrt{300}$	20) $\sqrt{75}$

Answer Choices:

$3\sqrt{10}$	$7\sqrt{2}$	$2\sqrt{6}$	$\sqrt{4}$	9	$3\sqrt{7}$	$5\sqrt{3}$	$4\sqrt{3}$	$4\sqrt{6}$	$2\sqrt{5}$
?	A	A	!	R	E	!	S	S	V
2	$\sqrt{7}$	$2\sqrt{7}$	$\sqrt{3}$	10	$16\sqrt{2}$	$2\sqrt{2}$	6	12	$9\sqrt{8}$
W	H	O	T	E	J	E	V	R	O
$3\sqrt{5}$	$3\sqrt{2}$	$8\sqrt{3}$	$4\sqrt{2}$	$9\sqrt{2}$	3	$\sqrt{12}$	$6\sqrt{2}$	1	$\sqrt{10}$
G	T	E	R	Q	U	W	E	C	T
7	25	11	$8\sqrt{2}$	$24\sqrt{2}$	$2\sqrt{3}$	$5\sqrt{2}$	8	$10\sqrt{3}$	4
P	R	U	W	H	B	H	A	M	T



Why are frogs so happy?



THEY EAT WHAT EVER BUGS THEM!

Solving Quadratics by Square Roots

Without using a calculator, see how many of the first 12 perfect squares you can name.

1 4 9 16 25 36 49 64 81 100 121 144

Simplifying Non-Perfect Squares: Find a perfect square that goes into the radicand, break into 2 radicals, and simply. Repeat if possible.

$\sqrt{12} = 2\sqrt{3}$ $\sqrt{20} = 2\sqrt{5}$ $\sqrt{30} = \sqrt{30}$ $\sqrt{75} = 5\sqrt{3}$

(Handwritten annotations: For $\sqrt{12}$, 2 is circled and 4 and 3 are shown as factors of 12. For $\sqrt{20}$, 2 and 5 are shown as factors of 20. For $\sqrt{75}$, 25 and 3 are shown as factors of 75.)

Taking the Square Root: Using your calculator, calculate the following.

$(-8)^2 = 64$ $(8)^2 = 64$ $(5)^2 = 25$ $(-5)^2 = 25$

$(-8)(-8) = 64$ $(5)(5) = 25$ $(-5)(-5) = 25$

(Handwritten note: "Parenthesis" with an arrow pointing to the negative signs in the equations above.)

Without using your calculator, take the square root of the following integers.

$\sqrt{16} = 4$ $\sqrt{49} = 7$ $\sqrt{100} = 10$ $\sqrt{12} = 2\sqrt{3}$ $\sqrt{1} = 1$

We are going to use this information to help us solve quadratic equations by taking the square root.

When solving by square roots, you want to:

- ① get whatever is squared
 x^2 , $(x+\#)^2$
- ② Square Root Both Sides of equation
(include \pm)
- ③ Simplify radical if possible
- ④ Break into 2 equations & solve

① x^2 or ② $(x+\#)^2$ → Square Root Method
One term has x

$ax^2 + bx + c$ → Factoring

Two terms have x , x^2



Steps: Isolate whatever is being squared, square root both sides (include +/- and break into two equations), simplify the radicals if possible, solve for x

$$1) 3x^2 + 7 = 55$$

$$\begin{array}{r} -7 \quad -7 \\ \hline 3x^2 = 48 \\ \hline 3 \quad 3 \end{array}$$

$$\sqrt{x^2} = \sqrt{16}$$

$$x = \pm 4$$

$$\boxed{x = 4, -4}$$

→ Subtract
Add
Divide
Multiply
Exponent
Parenthesis

$$2) (x-7)^2 = 81$$

$$x-7 = \pm 9$$

$$\begin{array}{l} \swarrow \quad \searrow \\ x-7 = 9 \quad x-7 = -9 \\ +7 \quad +7 \quad +7 \quad +7 \\ \hline \hline \end{array}$$

$$\boxed{x = 16} \quad \boxed{x = -2}$$

$$3) x^2 - 16 = 0$$

$$\begin{array}{r} +16 \quad +16 \\ \hline \sqrt{x^2} = \sqrt{16} \end{array}$$

$$x = \pm 4$$

$$\boxed{x = 4, -4}$$

$$4) -3x^2 - 6 = -x^2 - 12$$

$$\begin{array}{r} +3x^2 \quad +3x^2 \\ \hline -6 = 2x^2 - 12 \\ +12 \quad +12 \\ \hline 6 = 2x^2 \\ \frac{6}{2} = \frac{2x^2}{2} \end{array}$$

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

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

$$\boxed{x = \sqrt{3}, -\sqrt{3}}$$

5) $(x+1)^2 = 50$

$\sqrt{(x+1)^2} = \sqrt{50}$

$x+1 = \pm 5\sqrt{2}$

$\sqrt{50} = \sqrt{25 \cdot 2} = 5\sqrt{2}$

$x+1 = 5\sqrt{2}$

$x+1 = -5\sqrt{2}$

$x = -1 + 5\sqrt{2}$

$x = -1 - 5\sqrt{2}$

6) $4x^2 - 9 = 0$

$+9 +9$

$4x^2 = 9$

$\frac{4x^2}{4} = \frac{9}{4}$

$x^2 = \frac{9}{4}$

$\sqrt{x^2} = \sqrt{\frac{9}{4}}$

$x = \pm \frac{\sqrt{9}}{\sqrt{4}} = \pm \frac{3}{2}$

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

7) $-7(x-10)^2 - 6 = -258$

$+6 +6$

$-7(x-10)^2 = -252$

$\frac{-7(x-10)^2}{-7} = \frac{-252}{-7}$

$(x-10)^2 = 36$

$\sqrt{(x-10)^2} = \sqrt{36}$

$x-10 = \pm 6$

$x-10 = 6$

$+10 +10$

$x = 16$

$x-10 = -6$

$+10 +10$

$x = 4$

S
A
D
M
E
P

8) $(x+3)^2 - 20 = 7$

$+20 +20$

$(x+3)^2 = 27$

$\sqrt{(x+3)^2} = \sqrt{27}$

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

$x+3 = 3\sqrt{3}$

$-3 -3$

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

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

$-3 -3$

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

Simplify
PEMDAS
←
Solve using inverses

Solving Quadratics by Square Roots – Practice

For each of the following questions, find the roots.

1) $x^2 = 25$

$x = 5, -5$

2) $2x^2 = 98$

$x = 7, -7$

3) $x^2 - 1 = 0$

$x = 1, -1$

4) $9x^2 - 16 = 0$

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

5) $x^2 + 9 = 25$

$x = 4, -4$

6) $4(x-2)^2 = 100$

$\sqrt{(x-2)^2} = \sqrt{25}$
 $x-2 = \pm 5$
 $x-2 = 5$
 $\quad +2 \quad +2$
 $\boxed{x = 7}$
 $x-2 = -5$
 $\quad +2 \quad +2$
 $\boxed{x = -3}$

7) $(x-2)^2 + 9 = 25$

8) $(4x-2)^2 + 9 = 25$

$-9 -9$
 $\sqrt{(4x-2)^2} = \sqrt{16}$
 $4x-2 = \pm 4$
 $4x-2 = 4$
 $\quad +2 \quad +2$
 $\frac{4x}{4} = \frac{6}{4}$
 $\boxed{x = \frac{3}{2}}$
 $4x-2 = -4$
 $\quad +2 \quad +2$
 $\frac{4x}{4} = \frac{-2}{4}$
 $\boxed{x = -\frac{1}{2}}$

S
A
D
M
E
P

S ✓
A ✓
D
M
E ✓
P

Solve the following quadratic equation for all values of x in simplest form.

$$\begin{aligned}4(x-7)^2 - 2 &= 2 \\ \frac{4(x-7)^2}{4} &= \frac{4}{4} \\ \sqrt{(x-7)^2} &= \sqrt{1} \\ x-7 &= \pm 1 \\ \begin{array}{l} \swarrow \\ x-7=1 \\ \frac{x-7}{+7 \quad +7} \\ \hline x=8 \end{array} & \quad \begin{array}{l} \searrow \\ x-7=-1 \\ \frac{x-7}{+7 \quad +7} \\ \hline x=6 \end{array}\end{aligned}$$

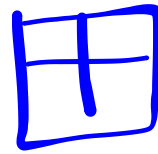
2 terms |

① GCF

② Difference of \square ($\#^2 - \#^2$)3 terms |

① GCF

② trinomial

* Perfect \square tri. $\begin{matrix} ac \\ \diagdown \\ b \end{matrix}$ GCF
rows &
columns

 If solving,
 set factors = 0 and solve for x.

$$2x^2 - 5x + 3 = 0$$

Not SRM, because
x and x²

	x	-1
2x	2x ²	-2x
-3	-3x	+3

$$\begin{array}{r}
 2x^2 \\
 -2x \\
 \hline
 -5x + 3 \\
 \hline
 -5x + 3 \\
 \hline
 0
 \end{array}$$

$$(x-1)(2x-3) = 0$$

$$\begin{array}{l}
 x-1=0 \\
 +1+1 \\
 \hline
 x=1 \quad \checkmark
 \end{array}$$

$$\begin{array}{l}
 2x-3=0 \\
 +3+3 \\
 \hline
 2x=3 \\
 \frac{2x}{2} = \frac{3}{2} \\
 x = \frac{3}{2} \quad \checkmark
 \end{array}$$

$$49x^2 - 42x + 7 = -2$$

+2 +2

$$\hline 49x^2 - 42x + 9 = 0$$

$$\sqrt{(7x + 3)^2} = \sqrt{0}$$

$$7x + 3 = 0$$

-3 -3

$$\hline \frac{7x}{7} = \frac{-3}{7}$$

~~$$49x^2 - 42x + 7 = -2$$~~

$$\begin{array}{r|l} 49 & \\ \hline 9 & 49 \\ \hline 63 & 7 \\ \hline 21 & 21 \end{array}$$