

Investigation 28 Solving Quadratic Equations by Square Roots Name: \_\_\_\_\_

If a quadratic has no  $x$ 's that aren't squared, you can solve by square roots.

Which of the following can be solved by square roots?

$$4x^2 - 25 = 0$$

$$3x^2 + 2x = 24$$

$$x^2 - \frac{1}{4} = 0$$

$$3(x + 2)^2 + 27 = 0$$

$$x^2 + 64x = 0$$

$$3(x + 2)^2 + 27x = 81$$

Example 1:  $4x^2 - 25 = 0$

To solve a quadratic by square roots, isolate the  $x^2$ .

$$4x^2 = 25$$

$$x^2 = \frac{25}{4}$$

Once the squared is alone, square root both sides. Don't forget that you need  $\pm$ !

$$x = \pm \sqrt{\frac{25}{4}}$$

Next, simplify the expression.

$$x = \pm \frac{5}{2}$$

Example 2:  $x^2 + 64 = 0$

Example 3:  $(x - 3)^2 + 32 = 0$

Example 4:  $3(x + 2)^2 - 27 = 0$

Example 5:  $6x^2 = 15$

# Did You Hear About The . . .

1.	2.	3.	4.	5.	6.	7.
8.	9.	10.	11.	12.	13.	14.

Solve by finding square roots. Express irrational solutions as decimals rounded to the nearest tenth. Write the word next to the solution in the box containing the number of the exercise.

1.  $3n^2 + 10 = 85$

2.  $16 - \frac{1}{5}x^2 = 9$

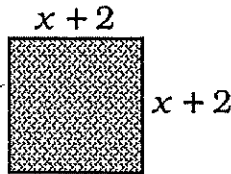
3.  $(w - 2)^2 = 9$

4.  $(d + 8)^2 = 225$

5.  $6(y - 5)^2 = 24$

6.  $4(a + 9)^2 = 120$

7. The area of the square at right is 100 square units. Find the value of  $x$ .



8.  $x^2 - 10x + 25 = 64$

9.  $b^2 + 4b + 4 = 15$

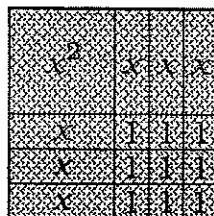
10.  $p^2 - 14p + 49 = 38$

11.  $t^2 - 24t + 144 = 900$

12.  $(m - \frac{7}{2})^2 = 1$

13.  $y^2 + 3y + \frac{9}{4} = 25$

14. The area of the square at right is 72 square units. Find the value of  $x$ .



Answers 1-7

±6.5 • KISS

5, -1 • WHO

-3.5, -14.5 • TO

6 • CRUNCH

7, -23 • WAS

±5 • CANDY

-11.5, 2.5 • UP

8 • SEE

4, -3 • THAT

7, 3 • SENT

±5.9 • BAR

9, 4 • EATEN

Answers 8-14

5.8 • CHOCOLATE

13.2, 0.8 • BECAUSE

-8.5, 4.5 • WILD

5.5 • NUTS

13, -3 • A

2.2, -6.8 • TEACHER

42, -18 • HE

5.5, -1.5 • MELTED

-6.5, 3.5 • HALF

1.9, -5.9 • PSYCHIATRIST

9.4, 1.6 • WHO

4.5, 2.5 • WAS