Name _____ Period_____ Date_____

Square Roots (page 1)

A **square root** of a number is a number that, when multiplied by itself, equals the given number. Every positive number has a positive and a negative square root. The **principal square root** is the *nonnegative* square root of a nonnegative real number. For example, the principal square root of 9 is 3, although *both* -3 and 3 are square roots of 9. A **perfect square** is a number with integers as its square roots. The symbol $\sqrt{\ }$ is called a radical sign. The number under the radical sign is called the radicand.

Positive/principal square root	$\sqrt{16}=4$
Negative square root	$-\sqrt{16}=-4$
Both square roots	$\pm\sqrt{16}=\pm4$

Examples:

Find the answers:

a) $\sqrt{36}=6$

b) $-\sqrt{\frac{4}{25}}=-\frac{2}{5}$

c) $\pm\sqrt{1.44}=\pm1.2$

d) $\sqrt{2.25}=1.5$

e) $-\sqrt{81}=-9$

f) $\pm\sqrt{\frac{9}{64}}=\pm\frac{3}{8}$

Evaluate the expressions:

a) $3\sqrt{16}=3(4)$
$=12$

b) $\left(\sqrt{25}\right)^2+\sqrt{196}=25+14$
$=39$

c) $\sqrt{\frac{16}{4}}+\frac{1}{2}=\sqrt{4}+\frac{1}{2}$
$=2+\frac{1}{2}$
$=2\frac{1}{2}$

Solve for x.

a) $x^2=81$

$x^2=81$
$\sqrt{x^2}=\sqrt{81}$
$x=\pm9$

(When solving an equation, show both roots.)

b) As square with side length *x* has an area of 400 square inches. The equation $x^2=400$ shows the area. What is the side length of the square?

$x^2=400$
$\sqrt{x^2}=\sqrt{400}$
$x=20\text{ inches}$

(A negative root would not make sense.)

Square Roots (page 2)

***Find the two square roots of the number*:**

1. 36

2. 289

3. 144

Simplify the expressions:

4. $-4\sqrt{64}$

5. $\left(\sqrt{121}\right)^2+\sqrt{81}$

6. $\frac{3}{4}+\sqrt{\frac{49}{16}}$

7. $\pm\sqrt{225}$

8. $-2\sqrt{400}+121$

9. $\sqrt{25}-9$

10. $-\sqrt{\frac{81}{100}}$

11. $-\sqrt{36}$

12. $\sqrt{0.49}$

Solve:

13. $y^2=36$

14. $x^2=0.25$

15. $y^2=1$

16. $r^2=-25$

17. A kids karate match is held on a square mat that has an area of 361 ft^2. What is the length of each side?