Square Roots

Review:

1) What is the square of 3?

The square of 3

$$= 3^2$$
$$= 3 \cdot 3$$
$$= \boxed{9}$$

2) What is the square of -3?

The square of -3 is

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

$$\left\{ \quad \underline{-(3)^2} = -9 \right.$$

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1) What is the positive value of a if the square of a is 9?

$$a^2 = 9$$
$$a = \sqrt{9} \qquad \qquad \sqrt{} = \text{radical sign}$$
$$a = 3$$

the square root of a

If $a \geqslant 0$, "$\sqrt{a}$" means the non-negative number whose square is a.

Note: $\boxed{\sqrt{0} = 0}$

2) What is the negative value of a if

2) whuuh is the negative value of a if the square of a is 9?

$$a^2 = 9$$
$$a = -\sqrt{9}$$
$$a = -3$$

Ex: $\sqrt{36} = 6$ $-\sqrt{36} = -6$
                                                    $\downarrow$
                                                    6

Ex: $\sqrt{49} = 7$ $-\sqrt{121} = -11$

$\sqrt{100} = 10$ $-\sqrt{16} = -4$

$\sqrt{400} = 20$

3) What are the values of a if the square of a is 9?

$$a^2 = 9$$
$$a = \sqrt{9} \quad \text{or} \quad a = -\sqrt{9}$$
$$a = 3 \quad \text{or} \quad a = -3$$

What are the values of a if the

square of a is 64? ... is 81?

$$a^2 = 64$$
$$a = \sqrt{64} \quad \text{or} \quad a = -\sqrt{64}$$
$$a = 8 \quad \text{or} \quad a = -8$$

$$a^2 = 81$$
$$a = \sqrt{81} \quad \text{or} \quad a = -\sqrt{81}$$
$$a = 9 \quad \text{or} \quad -9$$

$\sqrt{(-4)^2}$ ⟨ 4 ?

−4 ?

$$\sqrt{(-4)^2} = \sqrt{(-4)(-4)}$$
$$= \sqrt{16}$$
$$= 4$$

$a =$
$\sqrt{-4}$ ⟨ 2 X

−2 X

not real number

$$a^2 = -4$$

a ⟨ positive
negative
0

a^2 ⟨ +
+

∩

Ex: $\sqrt{\frac{1}{4}} = \frac{1}{2}$ because $\frac{1}{2} \geqslant 0$

and $\left(\frac{1}{2}\right)^2 = \frac{1}{2} \cdot \frac{1}{2} = \frac{1}{4}$

Ex: $\sqrt{\frac{4}{9}} = \frac{2}{3}$ because $\frac{2}{3} \cdot \frac{2}{3} = \frac{4}{9}$

Ex: $\sqrt{\frac{1}{100}} = \frac{1}{10}$ Ex: $\sqrt{\frac{2500}{16}} = \frac{50}{4}$

$= \boxed{\frac{25}{2}}$