Radical Expressions

When you have a negative under a square root it is called an "imaginary" number.

Ex 1 Evaluate the expression $\sqrt{2x+7}$ for $x = 3$. Is the result a real number?

$$\sqrt{2(3)+7}$$
$$\sqrt{6+7}$$
$$\sqrt{13}, \text{ yes, } 13 \text{ is positive.}$$

Ex 2 Evaluate $\sqrt{9-3x}$ for $x = 5$

$$\sqrt{9-3(5)}$$
$$\sqrt{9-15}$$
$$\sqrt{-6}, \text{ no, } -6 \text{ is negative.}$$

3 Determine the values of x that make each expression a real number.

(a) $\sqrt{4x}$ $\dfrac{4x}{4} \geq \dfrac{0}{4}$

$$\boxed{x \geq 0}$$

(b) $\sqrt{27x}$ $\dfrac{27x}{27} \geq \dfrac{0}{27}$

$$x \geq 0$$

(c) $\sqrt{x+7}$ $x+7 \geq 0$
$$\underline{-7 \quad -7}$$
$$\boxed{x \geq -7}$$

(d) $\sqrt{x^2+5}$ $x^2+5 \geq 0$
$$\underline{-5 \quad -5}$$
$$x^2 \geq -5$$
all real #s.