Properties of square roots

$\sqrt{16} = 4 \iff 16 = 4^2 \iff 16^{\frac{1}{2}} = 4$

Definition: $(\sqrt{a})^2 = a$ (principal root (positive))

note: $(-\sqrt{a})^2 = a$

$(-4)(-4) = 16$

$x^2 = 9 \quad x = \pm\sqrt{9}$ or $-\sqrt{9}, +\sqrt{9}$

Addition

$\sqrt{b} + \sqrt{b} = 2\sqrt{b}$,

$\sqrt{7} + \sqrt{7} = 2\sqrt{7} \neq \sqrt{14}$

but $\sqrt{a} + \sqrt{b} = \sqrt{a} + \sqrt{b}$

$\sqrt{5} + \sqrt{9} \neq \sqrt{}$

$x + y = 2\sqrt{xy}$

Multiplication

$\sqrt{c} \times \sqrt{d} = \sqrt{cd}$

factoring

$\sqrt{2} \times \sqrt{7} = \sqrt{14}$

$\sqrt{24} = \sqrt{4}\sqrt{6} = 2\sqrt{6}$

Inverse (reciprocal)

$$\sqrt{\frac{1}{k}} = \frac{1}{\sqrt{k}}$$

$\sqrt{\frac{9}{48}} = \frac{\sqrt{9}}{\sqrt{48}} = \frac{3}{\sqrt{16}\sqrt{3}} = \frac{3}{4\sqrt{3}}$ —

Notation conventions

47°F

χ

ξ errors

Greek letters:

α alpha, β beta, γ gamma, δ delta, ϵ epsilon

π pi, θ theta, σ sigma, ϕ phi

Capital Greek letters: Σ Sigma, Δ Delta

Angle measures: 45°, $\frac{5}{6}\pi$ radians, x, θ, A

Trigonometry situations

The tangent of an angle in a right triangle is the ratio of the opposite side's length to the length of the leg adjacent to the angle

Solve for the missing side length, x

literal

1. $\tan\theta = \frac{x}{10}$

$*10$

$10 \cdot \tan\theta = \frac{x}{10} \times 10$

$10\tan\theta = x$

$x = 10\tan\theta$

literal

2. $\tan\theta = \frac{20}{x}$ $\leftarrow * x$

$x\tan\theta = 20$

$\div \tan\theta$

$x = \frac{20}{\tan\theta}$