# Square Root of a Variable

If $a$ is a positive real number and *m* is an even integer, then $\sqrt{a^m} = a^{\frac{m}{2}}$ Remember: $a^{\frac{power}{root}}$

$\sqrt{a^6} = a^{\frac{6}{2}} = a^3$ $\sqrt{z^{36}} = z^{\frac{36}{2}} = z^{18}$ CAUTION: It is very tempting to take the square root of 36and answer incorrectly $z^6$

If *m* is an odd integer, rewrite *m* as the sum of a multiple of 2 and 1.

$\sqrt{a^7} = \sqrt{a^{6+1}} = \sqrt{a^6}\sqrt{a} = a^3\sqrt{a}$ $\sqrt{a^{15}} = \sqrt{a^{14+1}} = \sqrt{a^{14}}\sqrt{a} = a^7\sqrt{a}$

TRY:

$\sqrt{n^5}$ $\sqrt{z^9}$

Combinations: $\sqrt{12x^{11}} = \sqrt{3\cdot 4\cdot x^{10}\cdot x} = 2x^5\sqrt{3x}$

TRY:

$\sqrt{12x^8}$ $\sqrt{36n^2}$

$\sqrt{3n^3}$ $\sqrt{8z^{16}}$