Day 5 – Simplifying Radicals with Variables – Notes

When simplifying radical expressions, you simplify the variables using the same method as you did previously (Remember $\sqrt{x^2} = x$; square and square roots undo each other).

a. $\sqrt{x^8}$

$\sqrt{(x\cdot x)(x\cdot x)(x\cdot x)(x\cdot x)}$

$x \cdot x \cdot x \cdot x$

x^4

b. $\sqrt{x^5}$

$\sqrt{(x\cdot x)(x\cdot x)\,x}$

$x \cdot x \cdot \sqrt{x}$

$x^2\sqrt{x}$

c. $\sqrt{y^4z^3}$

$\sqrt{(y\cdot y)(y\cdot y)(z\cdot z)\,z}$

$y \cdot y \cdot z\sqrt{z}$

$y^2z\sqrt{z}$

Simplifying Radical Expressions with Square Roots

When simplifying radical expressions, you simplify both the coefficients and variables using the same method as you did previously (Remember $\sqrt{x^2} = x$; square and square roots undo each other). Remember, anything that is left over stays under the radical!

a. $\sqrt{9x^6}$ P.S.

$3x^3$

b. $\sqrt{4x^4}$ P.S.

$2x^2$

c. $\sqrt{32z^7}$

$\sqrt{(2\cdot2)(2\cdot2)\,2\,(z\cdot z)(z\cdot z)(z\cdot z)\,z}$

$2\cdot2\cdot z\cdot z\cdot z\sqrt{2z}$

$4z^3\sqrt{2z}$

d. $\sqrt{45y^2}$

$\sqrt{(3\cdot3)\,5\,(y\cdot y)}$

$3y\sqrt{5}$

e. $2\sqrt{27a^4b}$

$2\cdot\sqrt{(3\cdot3)\,3\,(a\cdot a)(a\cdot a)\,b}$

$2\cdot3\cdot a\cdot a\cdot\sqrt{3b}$

$6a^2\sqrt{3b}$

f. $3\sqrt{12x^2}$

$3\cdot\sqrt{(2\cdot2)\,3\,(x\cdot x)}$

$3\cdot2\cdot x\sqrt{3}$

$6x\sqrt{3}$

g. $3\sqrt{18a^4}$

$3\cdot\sqrt{2\cdot(3\cdot3)(a\cdot a)(a\cdot a)}$

$3\cdot3\cdot a\cdot a\sqrt{2}$

$9a^2\sqrt{2}$

h. $-2\sqrt{36f^3g^4}$ P.S.

$-2\cdot6\sqrt{(f\cdot f)\,f\,(g\cdot g)(g\cdot g)}$

$-12fg^2\sqrt{f}$

i. $5\sqrt{20x^{16}y^{10}}$

$5\sqrt{(2\cdot2)\,5\,(x^{16})(y^{10})}$

$5\cdot2\cdot x^8y^5\sqrt{5}$

$10x^8y^5\sqrt{5}$