Name key Date_____ Hour_____

Simplifying Radicals

Section 5.4 Intro – Algebra 2 Trig G

List the perfect squares from 1 through 225:

1, 4, 9, 16, 25, 36, 49, 64, 81, 100, 121, 144, 169, 196, 225

Solve $x^2 = 20$. Write the solution in radical form:

$\sqrt{x^2} = \sqrt{20}$

$x = \pm\sqrt{20}$

Now it should be simplified

1) Look for perfect square factors greater than one. Is 16 a factor? Is 9? Is 4?

2) Breakdown 20 using that perfect square

3) Split up into two radicals

4) Write the simplified form.

$\sqrt{20}$

$\sqrt{4 \cdot 5}$

$\sqrt{2^2 \cdot 5}$

$\boxed{2\sqrt{5}}$

Example: Simplify $\sqrt{50}$

1)Look for perfect square factors

2) Breakdown 50

3) Split Up Radical

4) Write simplified form

$\sqrt{50}$

$\sqrt{25 \cdot 5}$

$\sqrt{5^2 \cdot 5}$

$\boxed{5\sqrt{5}}$

Simplify each of the following radicals:

1) $\sqrt{75}$

$\sqrt{25\ 3}$

$\sqrt{5^2} \cdot \sqrt{3}$

$\boxed{5\sqrt{3}}$

2) $\sqrt{32}$

$\sqrt{16 \cdot 2}$

$\sqrt{4^2} \cdot 2$

$\boxed{4\sqrt{2}}$

3) $\sqrt{18}$

$\sqrt{9 \cdot 2}$

$\sqrt{3^2} \cdot 2$

$\boxed{3\sqrt{2}}$

4) $\sqrt{24}$

$\sqrt{4 \cdot 6}$

$\sqrt{2^2} \cdot 6$

$\boxed{2\sqrt{6}}$

What if there is a variable under the radical?

5) $\sqrt{16x^2}$

$\sqrt{4^2 \cdot x^2}$

$\boxed{4x}$

6) $\sqrt{50x^3}$

$\sqrt{25 \cdot 2 \cdot x^3}$

$\sqrt{5^2 \cdot 2 \cdot x^2 \cdot x}$

$\boxed{5x\sqrt{2x}}$

7) $\sqrt{125x^2y^4}$

$\sqrt{5^2 \cdot 5 \cdot x^2 \cdot y^2 \cdot y^2}$

$5xyy\sqrt{5}$

$\boxed{5xy^2\sqrt{5}}$

8) $\sqrt{49x^5y^4z^2}$

$\sqrt{7^2 \cdot x^2 \cdot x^2\ x \cdot y^2 \cdot y^2 \cdot z^2}$

$\boxed{7x^2y^2z\sqrt{x}}$

9) $\sqrt{90x^4y^7}$

$\sqrt{3^2\ 10 \cdot x^2 \cdot x^2 \cdot y^2 \cdot y^2 \cdot y^2 \cdot y}$

$3xxy \cdot y \cdot y\sqrt{10y}$

$\boxed{3x^2y^3\sqrt{10y}}$

10) $\sqrt{7xy^3}$

$\sqrt{7 \cdot x \cdot y^2 \cdot y}$

$\boxed{y\sqrt{7xy}}$

Now try these on your own!

11) $\sqrt{36x^4}$

$\sqrt{6^2 \cdot x^2 \cdot x^2}$

$6xx$

$\boxed{6x^2}$

12) $\sqrt{200x^2y^2}$

$\sqrt{10^2 \cdot 2 \cdot x^2 \cdot y^2}$

$\boxed{10xy\sqrt{2}}$

13) $\sqrt{13x^6y^3}$

$\sqrt{13 \cdot x^2 \cdot x^2 \cdot x^2 \cdot y^2 \cdot y}$

$\boxed{x^3y\sqrt{13y}}$

14) $\sqrt{75x^7y^5}$

$\sqrt{5^2 \cdot 3 \cdot x^2 \cdot x^2 \cdot x^2 \cdot x \cdot y^2 \cdot y^2 \cdot y}$

$\boxed{5x^3y^2\sqrt{3xy}}$