Name: Key **TA:**_____

Math 11 Pre-Calculus LG 9 Ver A

1. Convert to a mixed radical.

   a) $\sqrt{45}$

   $3\sqrt{5}$

   b) $\sqrt{125x^2y^5}$ $= \sqrt{5\cdot5\cdot5\cdot x\cdot x\cdot y\cdot y\cdot y\cdot y\cdot y}$

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

2. Order the following radicals from least to greatest by converting each one to an entire radical.

   $2\sqrt{5}$, $3\sqrt{2}$, $5\sqrt{3}$, $4\sqrt{4}$

   $\sqrt{20}$ $\sqrt{18}$ $\sqrt{75}$ $\sqrt{64}$

   $3\sqrt{2}, 2\sqrt{5}, 4\sqrt{4}, 5\sqrt{3}$

3. Simplify.

   a) $5\sqrt{3}-\sqrt{12}$

   $5\sqrt{3} - 2\sqrt{3}$

   $3\sqrt{3}$

   b) $5\sqrt[3]{16}-4\sqrt{2}+7\sqrt[3]{2}-2\sqrt{18}$

   $10\sqrt[3]{2} - 4\sqrt{2} + 7\sqrt[3]{2} - 6\sqrt{2}$

   $17\sqrt[3]{2} - 10\sqrt{2}$

4. Multiply and then simplify.

a) $(\sqrt{12})(\sqrt{6})$ $= \sqrt{72}$ $= \sqrt{36 \cdot 2}$

$6\sqrt{2}$

b) $4\sqrt{22x}(\sqrt{2x^4})$ $= 4\sqrt{44x^5}$

$8x^2\sqrt{11x}$

5. Expand and simplify.

a) $\left(5\sqrt{3}-\sqrt{8}\right)^2$

$(5\sqrt{3}-\sqrt{8})(5\sqrt{3}-\sqrt{8})$

$75 - 5\sqrt{24} - 5\sqrt{24} + 8$

$83 - 10\sqrt{24}$

$83 - 20\sqrt{6}$

b) $(2\sqrt{3}-5)(4\sqrt{8}+3\sqrt{6})$

$8\sqrt{24} + 6\sqrt{18} - 20\sqrt{8} - 15\sqrt{6}$

$16\sqrt{6} + 18\sqrt{2} - 40\sqrt{2} - 15\sqrt{6}$

$\sqrt{6} - 22\sqrt{2}$

6. Divide then rationalize the denominator.

$$\frac{-5\sqrt{12}}{10\sqrt{24}} = \frac{-1}{2\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{-\sqrt{2}}{4}$$

7. Rationalize the denominator. Simplify.

$$\frac{2\sqrt{3}}{5-2\sqrt{2}}\cdot\frac{(5+2\sqrt{2})}{(5+2\sqrt{2})} = \frac{10\sqrt{3}+4\sqrt{6}}{25-8} = \frac{10\sqrt{3}+4\sqrt{6}}{17}$$

8. Solve the following equations.

a) $5 = \sqrt{2x-3}$

$25 = 2x-3$

$\frac{28}{2} = \frac{2x}{2}$

$x = 14$ ✓

b) $-5 = 3+\sqrt{-8x}$

$-8 = \sqrt{-8x}$

$64 = -8x$

$\frac{64}{-8} = \frac{-8x}{-8}$

$-8 = x$

Test:

$-5 = 3+\sqrt{(-8)(-8)}$

$-5 = 3+\sqrt{64}$

$-5 = 3+8$

$-5 \neq 11$

NO Solution

c) $\sqrt{2x-3} = \sqrt{x+1}$

$2x-3 = x+1$

$-x \quad +3 \quad -x \quad +3$

$x = 4$ Test ✓

d) $\left(\sqrt{x+5}\right)^2 = (x-1)^2$

$x+5 = x^2-2x+1$

$0 = x^2-3x-4$

$0 = (x-4)(x+1)$

Test ✓ $x = 4$

$x = -1$ Test X

9. The formula $s = 2\pi\sqrt{\frac{l}{32}}$ represents the swing of a pendulum, where s is the time, in seconds, to swing back and forth, and l is the length of the pendulum, in feet.

a) Solve the formula for l.

$$\left(\frac{s}{2\pi}\right)^2 = \left(\sqrt{\frac{L}{32}}\right)^2$$

$$\frac{s^2}{4\pi^2} = \frac{L}{32}$$

$$L = \frac{32s^2}{4\pi^2}$$

$$\boxed{L = \frac{8s^2}{\pi^2}}$$

b) What is the length of a pendulum to **2 decimal places** that makes one swing in 1.5 s?

$$L = \frac{8(1.5)^2}{\pi^2} = \frac{18}{\pi^2}$$

$$L = 1.82 \text{ feet}$$