9.4 Notes
"Solve Polynomial Equations in Factored Form"

Use the zero product property to solve the equations....

1. $(x - 5)(x + 3) = 0$

$x - 5 = 0$ $x + 3 = 0$ $x = -3, 5$
$+5 \;\; +5$ $-3 \;\; -3$
$x = 5$ $x = -3$

2. $(2y + 5)(7y - 5) = 0$

$2y + 5 = 0$ $7y - 5 = 0$
$\quad -5 \;\; \cdot 5$ $\quad +5 \;\; +5$
$\dfrac{2y}{2} = \dfrac{-5}{2}$ $\dfrac{7y}{7} = \dfrac{5}{7}$ $y = -2.5, \frac{5}{7}$
$y = -2.5$ $y = \frac{5}{7}$

Factor out the greatest common monomial factor....

3. $\underline{4y^4} - \underline{16\,y^3}$

$\boxed{4y^3(y - 4)}$

$4y^3(y-4)$
$4y^4 - 16y^3$

4. $\underline{15p^7} + \underline{6p^2}$

$3p^2(5p^5 + 2\,)$

Solve the Equations....

5. $-10n^2 + 35n = 0$

$5n(-2n + 7) = 0$

$5n = 0$ $-2n + 7 = 0$
$\dfrac{5n}{5} = \dfrac{0}{5}$ $\quad -7 \;\; -7$
$n = 0$ $\dfrac{-2n}{-2} = \dfrac{-7}{-2}$
         $n = 3.5$
$\boxed{n = 0, 3.5}$

6. $3k^2 = 6k$

$\dfrac{-6k \;\; -6k}{3k^2 - 6k = 0}$

$3k(k - 2) = 0$

$\dfrac{3k}{3} = \dfrac{0}{3}$ $k - 2 = 0$
              $+2 \;\; +2$
$k = 0$ $k = 2$

$\boxed{k = 0, 2}$

Factor out the greatest common monomial factor – again....

7. $8a^2b - 6ab^2$

$\dfrac{8a^2b}{2ab} \quad \dfrac{6ab^2}{2ab}$

$4a - 3b$ $\boxed{2ab(4a - 3b)}$

Find the zeros of the function....

8. $f(x) = \dfrac{-2x^2}{x} + \dfrac{x}{x}$

$f(x) = x(-2x + 1)$

$x = 0$ $-2x + 1 = 0$
               $\quad -1 \;\; -1$
$\boxed{x = 0, \frac{1}{2}}$ $\dfrac{-2x}{-2} = \dfrac{-1}{-2}$
            $x = \frac{1}{2}$

9. **TABLETOP AREAS** A display in your school library sits on top of two rectangular tables arranged in an L shape, as shown. The tabletops have the same area.
   a.) Write an equation that relates the areas of the tabletops.
   b. Find the value of w. $w = 4$
   c. What is the combined area of the tabletops? 48 ft^2
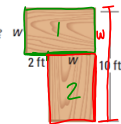
$A1 = \ell w$ $A2 = \ell w$
$A1 = (2 + w)w$ $A2 = (10 - w)w$
$A1 = w^2 + 2w$ $A2 = -w^2 + 10w$

$w^2 + 2w = -w^2 + 10w$
$\dfrac{+w^2 \qquad\qquad +w^2}{2w^2 + 2w = 10w}$
$\dfrac{\qquad\quad -10w \;\; -10w}{2w^2 - 8w = 0}$

$2w(w - 4) = 0$

$2w = 0$ $w - 4 = 0$
$w = 0$ $w = 4$

$A1 = w^2 + 2w$
$A1 = (4)^2 + 2(4)$
$A1 = 16 + 8$
$A1 = 24$
$\dfrac{+24}{48}$