**9.4: Solve Polynomial Equations in Factored Form**

**Goals:** \*Understand and find “roots” of polynomial equations

 \*Factor polynomials by finding the GCF

 \*Solve polynomial equations by factoring

**Roots:**

**Zero-product property:**

**Solve using the zero-product property:**

**Ex:** (*x* + 2)(*x* + 4) = 0

**Solve:**

**Ex:** (*x* – 5)(*x* – 1) = 0 **Ex:** (*x* + 3)(*x* – 5) = 0

**Ex:** (2*x* + 1)(3*x* – 4) = 0 **Ex:** 4*x*(3*x* – 2)(5*x* + 4) = 0

**Factor:**

**Factor by finding the Greatest Common Factor:**

**Ex:** 12*x* + 42*y* What do both terms have in common that you can divide by?

 Look for the **greatest** factor they have in common.

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 When you factor by using the GCF you are essentially:

 Which means you could check your answer by:

**Ex:** 4*x*4 + 24*x*3 **Ex:** 14*m* + 35*n* **Ex:** 8*x* + 12*y*

**Ex:** 14*y*² + 21*y* **Ex:** 6*x*²*y* + 9*xy*² **Ex:** 4*t*² – 2*t*

**Solve by factoring first:**

**Ex:** 2*x*² + 8*x* = 0 **Ex:** 3*x*² + 18*x* = 0

**Ex:** *a*² + 5*a* = 0 **Ex:** 3*s*² – 9*s* = 0

**Solve by factoring:**

**Ex:** 6*n*² = 15*n* **Ex:** 4*x*² = 2*x* **Ex:** 4*s*² = 14*s*

**Vertical Motion Model:**

*h* = *t* =

*v* = *s* =

**Ex:** A startled armadillo jumps straight into the air with an initial velocity of 14 ft/s. After how many seconds does it land back on the ground?

**Ex:** A dolphin jumped out of the water with an initial velocity of 32 ft/s. How many seconds does it take for the dolphin to re-enter the water?

**Ex:** Two rectangular rooms in a building’s floor plan have different dimensions but the same area. The dimensions (in meters) are shown. What is the value of *w*?