

## **Friday: Math Riddle/Job interview**

**Question:** A snail is at the bottom of a 30 foot well. Every hour the snail is able to climb up 3 feet, then immediately slide back down 2 feet. How many hours does it take for the snail to get out of the well?

**Answer:** 28 hours. The snail is travelling at one foot per hour, except on the 28<sup>th</sup> hour the snail has already reached the top of the well, so it will not slide down the 2 feet.

Answers to Factoring Trinomials

- |                    |                    |                    |                   |
|--------------------|--------------------|--------------------|-------------------|
| 1) $(n-2)(n-1)$    | 2) $(x-7)(x+9)$    | 3) $(k-2)(k-3)$    | 4) $(n+9)(n+5)$   |
| 5) $(r-6)(r-9)$    | 6) $-6(2x+1)(x+6)$ | 7) $(3x-1)(x+6)$   | 8) $(7n+2)(n+6)$  |
| 9) $n(5n+7)(n-6)$  | 10) $(5x+7)(x+4)$  | 11) $(4m-9)(2m+3)$ | 12) $(r+3)(9r-4)$ |
| 13) $(2b+3)(5b-8)$ | 14) $(3n-8)(3n+2)$ | 15) $(b-9)(4b+1)$  |                   |

3)  $k^2 - 5k + 6$

$$\begin{array}{r} 6 \\ -1 - 6 = -7 \\ -2 - 3 = -5 \\ (k-2)(k-3) \end{array}$$

6)  $-12x^2 - 78x - 36$

$$\begin{array}{l} (-6)(2x^2 + 13x + 6) \\ (2)(6) = 12 \\ \begin{array}{|c|c|} \hline 1 & 12 \\ \hline 2 & 6 \\ \hline 3 & 4 \\ \hline \end{array} \\ -6(2x^2 + 12x + 6) \\ -6(x(2x+1) + 4(2x+1)) \\ -6(2x+1)(x+6) \end{array}$$

9)  $5n^3 - 23n^2 - 42n$

$$n(5n^2 - 23n - 42)$$

$$\begin{array}{r} (5)(-42) \\ -210 \\ \hline 2 \\ 3 \\ 7-30 \end{array}$$

$$n(5n^2 + 7n - 30n - 42)$$

$$n(n(5n+7) - 6(5n+7))$$

$$n(5n+7)(n-6)$$

13)  $10b^2 - b - 24$

$$(10)(-24) = -240$$

1	240
2	120
...	
10	24
12	20
+15	-16

$$\begin{array}{l} 10b^2 + 15b - 16b - 24 \\ \hline 5b(2b+3) - 8(2b+3) \\ (2b+3)(5b-8) \end{array}$$

## Solve by Factoring

**Zero Product Property:** if  $(a)(b)=0$  then either  $a=0$ ,  $b=0$ , or both equal zero.

When: You have an equation (=)

How:

1. Set the equation equal to 0
2. Factor the polynomial
3. Set each factor =0
4. Solve each equation

$x^2 - 14x = 0$ $x(x-14) = 0$ $x = 0 \quad x - 14 = 0$ $\quad \quad \quad +14 \quad +14$ $x = 0 \quad x = 14$	$5x^2 - 30x - 35 = 0$ $5(x^2 - 6x - 7) = 0$ $5(x-7)(x+1) = 0$ $5 \neq 0 \quad x-7=0 \quad x+1=0$ $\quad \quad \quad +7 \quad +7 \quad \quad -1 \quad -1$ $x = 7 \quad x = -1$	$6x^2 - 13x = 15$ $\quad \quad \quad -15 \quad -15$ $6x^2 - 13x - 15 = 0$ $(6)(-15) = -90$ $+5 - 18 = -13$ $6x^2 + 5x - 18x - 15 = 0$ $x(6x+5) - 3(6x+5) = 0$ $(6x+5)(x-3) = 0$ $6x+5=0 \quad x-3=0$ $\quad \quad -5 \quad -5 \quad \quad +3 \quad +3$ $\frac{6x}{6} = \frac{-5}{6} \quad x = 3$ $x = \frac{-5}{6}$
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## Solve by Square Root

When: You have an equation (=) that only has a single  $x^2$  or ( )<sup>2</sup> without a x

How:

1. Isolate the squared term
2. Take the square <sup>Root</sup> of both sides
3. Don't forget the +/-
4. Solve for the variable

$x^2 - 14 = 0$ $+14 +14$ <hr/> $x^2 = 14$ $\sqrt{x^2} = \sqrt{14}$ $x = \pm \sqrt{14}$ <hr/> $x = \sqrt{14}$ $x = -\sqrt{14}$	$5(x-2)^2 - 45 = 0$ $+45 +45$ <hr/> $\frac{5(x-2)^2}{5} = \frac{45}{5}$ $(x-2)^2 = 9$ $\sqrt{(x-2)^2} = \sqrt{9}$ $x-2 = \pm 3$ $x-2 = 3 \quad x-2 = -3$ $+2 +2 \quad +2 +2$ <hr/> $x = 5 \quad x = -1$	$(x-5)^2 - 13 = 15$ $+13 +13$ <hr/> $(x-5)^2 = 28$ $\sqrt{(x-5)^2} = \sqrt{28}$ $x-5 = \pm 2\sqrt{7}$ $+5 +5$ <hr/> $x = 5 \pm 2\sqrt{7}$
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$$(3)(3) = 9$$

$$(-3)(-3) = 9$$

$$\begin{array}{r} 28 \\ 2 \overline{) 28} \\ \underline{4} \phantom{0} \\ 24 \phantom{0} \\ \underline{28} \\ 0 \end{array}$$