3-29 Intro

Saturday, January 1, 2022 7:13 PM

Example Puzzle

A New Favorite Puzzle

$(10^{\frac{1}{10}})^{30}$ $(2^{\frac{1}{3}})^{30}$ Which is bigger?

$\| \quad \|$

$10^3 \quad 2^{10}$

$\sqrt[10]{10}$ or $\sqrt[3]{2}$

$10^3 = 1000$ $2^{10} = 1024$

Hint: They differ by less than 0.001.

2. Solve for x: $ax + b = c$.

A $= c/a$ B $= bc/a$ C $= (c+b)/a$ D $= c-b/a$ E $= (c-b)/a$

3. Solve for x: $2x + 7 = ax + k$

$-ax \quad -ax$

$2x - ax + 7 = k$

$(2-a)x + 7 = k$

$-7 \quad -7$

$(2-a)x = k-7$

$\div(2-a) \quad \div(2-a)$

$x = \frac{k-7}{2-a}$

A $= (2-k)/(a-7)$ B $= (k-7)/(2-a)$

C $= (k-7)/(a-2)$ D $= k-7/a-2$ E $=$?

Word Problems!

4. The sum of three consecutive numbers is 99. What are the numbers?

$x, x+1, x+2$

Word Problems!

$x = \frac{k-7}{2-a}$

4. The sum of three consecutive numbers is 99. What are the numbers?

$x, x+1, x+2$

$x + x+1 + x+2 = 99$

$m-1, m, m+1$

$m-1 + m + m+1 = 3m = 99$

5. Twice one number is three times another number. The sum of the two numbers is 110. What are the numbers?

$x+y=110$

$2 \cdot x = 3y$

6. The perimeter of a rectangle is twice its area. Find a formula for the length of the rectangle in terms of its width.

Answer: $\boxed{L = \frac{W}{W-1}}$

Perimeter $= 2L + 2W$

Area $= L \cdot W$

"$P = 2 \cdot A$" means $(2L + 2W) = 2(LW)$, so

$L + W = L \cdot W$, so $L - LW = -W$

$L(1-W) = -W$

$L = \frac{-W}{1-W} \cdot \frac{(-1)}{(-1)} = \frac{W}{W-1}$ ✓

4. Expand: $(1-x)(1+x+x^2) = (1)(1+x+x^2) - x(1+x+x^2)$

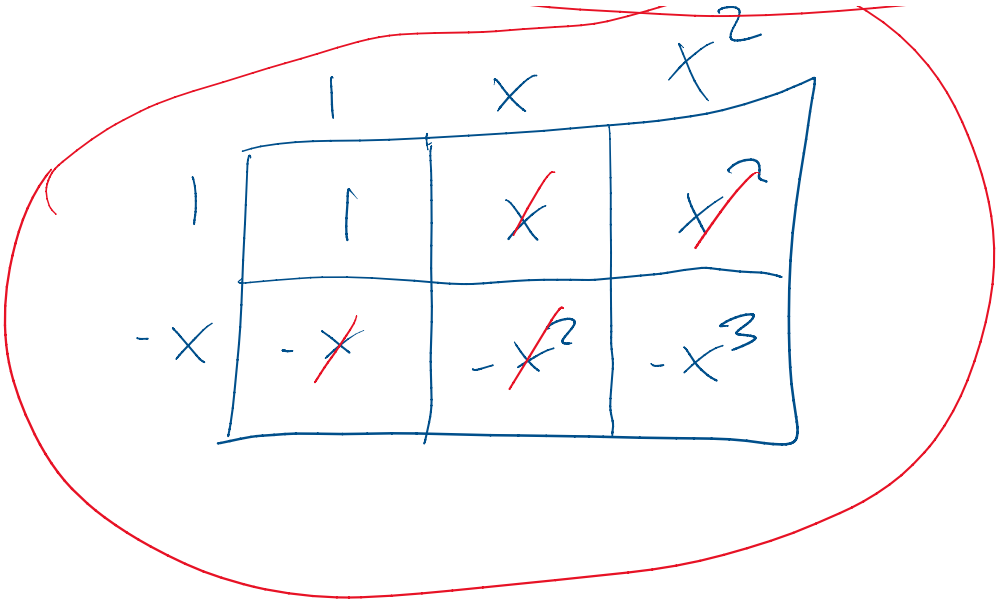
$= (1+x+x^2) - (x+x^2+x^3)$

$1 + x + x^2$

$-x - x^2 - x^3$

$= 1 + x + x^2 - x - x^2 - x^3$

$1 \quad x \quad x^2 \quad -1$



5. Twice one number is three times another number. The sum of the two numbers is 110. What ~~are the numbers~~?

$2 \cdot x = 3 \cdot y$ and $x + y = 110$

$x = 3p = 66$

$y = 2 \cdot p = 44$

$x + y = 3p + 2p = 5p = 110$

$p = 22$

You Try It!

3. Click A,B,C,D as you do these problems

(A) What is 20% of x? $.2x = \frac{x}{5}$

(B) What is 70% as a fraction? $\frac{70}{100} = \frac{7}{10}$

(C) What is x% of 50? $x\% \cdot 50 = 50\% \cdot x = \frac{x}{2}$

(D) What is $\frac{x}{x+1}$ as %?

$$\frac{x}{x+1} \cdot 100\% = \frac{100x}{x+1}\%$$

One More Problem!

6. Express x% of 4 plus y% of 3 as a percentage of 12.

$$\left(\frac{x}{100} \cdot 4 + \frac{y}{100} \cdot 3\right) = \frac{P}{100} \cdot 12$$

$$4x + 3y = P \cdot 12$$

$$P = \frac{x}{3} + \frac{y}{4}$$