Fun Word Problems Sheet Eight Key
You must get all parts of a problem correct to get the point, so be careful and check your work!

1. Find the perimeter of a rectangle whose length is twice its width, and its width is:

    (a) 3 feet
    (b) 5 feet
    (c) 2 feet
    (d) 7 inches
    (e) x feet

    Solution: The length depends on the width, and the perimeter depends on both the length and the width. Write the lengths as a middle step. As usual, be careful with units:

Width (input, x)	Length (middle step)	Perimeter (output, y)
3 feet	6 feet	18 feet
5 feet	10 feet	30 feet
2 feet	4 feet	12 feet
7 inches	14 inches	42 inches
x feet	$2x$ feet	$2(x) + 2(2x) = 6x$ feet

2. Find the area of a rectangle whose width is one-half of its length and its length is:

    (a) 4 feet
    (b) 10 inches
    (c) 3 feet
    (d) 7 inches
    (e) x inches

    Solution: This time, the input is the length. The width, and ultimately the area, depend on that length.

Length (input, x)	Width (middle step)	Area (output, y)
4 feet	2 feet	8 square feet
10 inches	5 inches	50 square inches
3 feet	1.5 feet	4.5 square feet
7 inches	3.5 inches	24.5 square inches
x feet	$\frac{1}{2}x$ feet	$\frac{1}{2}x^2$ square feet

3. Find the new price of a shirt if the price has gone up by 20% and the old price was:

   (a) $10

   (b) $30

   (c) $25

   (d) $17

   (e) $x   (please simplify by combining like terms)

   Solution: The increase (the amount that the price goes up) is 20% or the old price, that is, 0.20 times the old price. Then, the new price is the old price plus the increase.

Old price (input, x)	Increase (middle step)	New price (output, y)
$10	$2	$12
$30	$6	$36
$25	$5	$30
$17	$3.40	$20.40
x	$0.20x$	$1x + 0.20x = 1.20x$ dollars

4. Find the number of ounces of real fruit juice in a drink which contains 10% real fruit juice and has volume:

   (a) 8 ounces

   (b) 16 ounces

   (c) 24 ounces

   (d) 87 ounces

   (e) x ounces

   Solution: Any time you want a percentage of something, change the percent to a decimal and multiply. The volume of fruit juice is 10% of the total volume of the drink, so the volume of fruit juice is 0.10 times the total volume of the drink.

Percentage (constant)	Volume of drink (input, x)	Volume of fruit juice (output, y)
10%	8 ounces	0.8 ounces
10%	16 ounces	1.6 ounces
10%	24 ounces	2.4 ounces
10%	87 ounces	8.7 ounces
10%	x ounces	$0.10x$ ounces

5. Find a person's new hourly wage if they got a wage increase of 5% and their old wage was:

  (a) $10 per hour

  (b) $12 per hour

  (c) $20 per hour

  (d) $7 per hour

  (e) $$x$ per hour   (please simplify by combining like terms)

Solution: First figure out the wage increase (5% of the old wage), then add to the old wage to get the new wage. Units are dollars per hour, not just dollars. (You don't want to get just $10 total, you want $10 for each hour that you work!)

Percentage (constant)	Old wage (input, x)	Wage increase (middle step)	New wage (output, y)
5%	$10 per hour	$0.50 per hour	$10.50 per hour
5%	$12 per hour	$0.60 per hour	$12.60 per hour
5%	$20 per hour	$1.00 per hour	$21.00 per hour
5%	$7 per hour	$0.35 per hour	$7.35 per hour
5%	$$x$ per hour	$0.05x$ per hour	$1x + 0.05x = 1.05x$ dollars per hour