



## Problem of the Week

### Problem C and Solution

#### Greta's New Gig

#### Problem

Greta currently works 45 hours per week and earns a weekly salary of \$729. She will soon be starting a new job where her salary will be increased by 10% and her hours reduced by 10%. How much more will she be earning per hour at her new job?

#### Solution

##### Solution 1

To calculate how much Greta earns per hour (i.e. her hourly rate of pay), divide her weekly salary by the number of hours worked.

Greta's old hourly rate of pay is  $\$729 \div 45 \text{ h} = \$16.20/\text{h}$ .

$$\begin{aligned}\text{New Weekly Salary} &= \text{Old Weekly Salary} + 10\% \text{ of Old Weekly Salary} \\ &= \$729 + 0.1 \times \$729 \\ &= \$729 + \$72.90 \\ &= \$801.90\end{aligned}$$

$$\begin{aligned}\text{New Number of Hours Worked} &= \text{Old Hours Worked} - 10\% \text{ of Old Hours Worked} \\ &= 45 \text{ h} - 0.1 \times 45 \text{ h} \\ &= 45 \text{ h} - 4.5 \text{ h} \\ &= 40.5 \text{ h}\end{aligned}$$

Greta's new hourly rate of pay is  $\$801.90 \div 40.5 \text{ h} = \$19.80/\text{h}$ .

The change in her hourly rate of pay is  $\$19.80/\text{h} - \$16.20/\text{h} = \$3.60/\text{h}$ .

Therefore, Greta will be earning \$3.60/h more at her new job.

##### Solution 2

In the second solution we will use a more concise calculation. Greta's new weekly salary is 10% more than her old weekly salary. So Greta will earn 110% of her old weekly salary. Greta's hours will be reduced by 10%, so her new hours will be 90% of her old hours. To calculate her change in hourly rate we can take her new hourly rate and subtract her old hourly rate.

$$\begin{aligned}\text{Change in Hourly Rate} &= \text{New Hourly Rate} - \text{Old Hourly Rate} \\ &= \text{New Salary} \div \text{New Hours Worked} - \text{Old Salary} \div \text{Old Hours Worked} \\ &= (\$729 \times 1.10) \div (45 \times 0.9) - \$729 \div 45 \\ &= \$801.90 \div 40.5 - \$729 \div 45 \\ &= \$19.80/\text{h} - \$16.20/\text{h} \\ &= \$3.60/\text{h}\end{aligned}$$

Therefore, Greta will be earning \$3.60/h more at her new job.