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}.

\[
\begin{align*}
\text{New Weekly Salary} &= \text{Old Weekly Salary + 10\% of Old Weekly Salary} \\
&= 729 + 0.1 \times 729 \\
&= 729 + 72.90 \\
&= 801.90
\end{align*}
\]

\[
\begin{align*}
\text{New Number of Hours Worked} &= \text{Old Hours Worked - 10\% of Old Hours Worked} \\
&= 45 \text{ h} - 0.1 \times 45 \text{ h} \\
&= 45 \text{ h} - 4.5 \text{ h} \\
&= 40.5 \text{ h}
\end{align*}
\]

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.

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

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