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} = $16.20$/h$.

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\text{New Weekly Salary} = \text{Old Weekly Salary} + 10\% \text{ of Old Weekly Salary} = \$729 + 0.1 \times \$729 = \$729 + \$72.90 = \$801.90
\]

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

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

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

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\text{Change in Hourly Rate} = \text{New Hourly Rate} - \text{Old Hourly Rate} = \frac{\text{New Salary}}{\text{New Hours Worked}} - \frac{\text{Old Salary}}{\text{Old Hours Worked}} = \frac{(729 \times 1.10)}{45 \times 0.9} - 729 \div 45
\]

\[
= \frac{801.90}{40.5} - 729 \div 45
\]

\[
= 19.80$/h - 16.20$/h = 3.60$/h
\]

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