Problem Solving

Employees in 2012 paid 4.2% of their gross wages towards social security (FICA tax),

How much will someone earning $74,000 a year pay towards social security out of their gross wages?

Problem Solving

= 4.2% of $74,000
= 4.2% = \frac{4.2}{100} = 0.042
= 0.0042 of $74,000
= 0.0042 * $74,000
= $3,108

Absolute & Relative Changes

The population of a town increased from 3500 in 2005 to 5450 in 2012.

Find the absolute and relative (percent) increase.

Absolute & Relative Changes

Increased from 3500 to 5450

Absolute Increase
= Actual Change from 3500 to 5450
= 1950

Relative (percent) increase (from original)
= (1950 / 3500) = 0.5571
≈ 55.7%

Multiple % Discounts

A store has clearance items that have been marked down by 20%. They are having a sale, advertising an additional 60% off clearance items. What percent of the original price do you end up paying?
Multiple % Discounts
Original marked down by 20%
With additional 60% off
Example:
Original Price is $100
$100 * 0.20 = $20 off
Sale Price is $100 - $20 = $80
Additional 60% off so $80 * 0.60 = $48 off
Final Price is $80 - $48 = $32

Weighted Percent
You have a 83% average before the final exam. That score includes everything but the final, which counts for 25% of the course grade.

What is the final exam score needed for 80%?
Grade = (0.75 * 0.83) + (0.25 * FinalExam)
0.80 = (0.75 * 0.83) + (0.25 * FinalExam)
0.80 = (0.6225) + (0.25 * FinalExam)
FinalExam = 0.1775 / 0.25 = 0.71 = 71%

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Units

A car is driving at 70 kilometers per hour. How far, in meters, does it travel in 4 seconds?

\[
\frac{70\text{ km}}{1\text{ hr}} \times \frac{1000\text{ m}}{1\text{ km}} \times \frac{1\text{ hr}}{60\text{ min}} \times \frac{1\text{ min}}{60\text{ sec}}
\]

\[
\frac{70}{1} \times \frac{1000}{1} \times \frac{1}{60} \times \frac{1}{60} = \frac{70000\text{ m}}{3600\text{ sec}}
\]

\[
\frac{700}{36} \text{ m/sec} = \frac{175}{9} \text{ m/sec}
\]

Units

A car is driving at 70 kilometers per hour. How far, in meters, does it travel in 4 seconds?

\[
\frac{175}{9} \text{ m/sec}
\]

In 4 seconds:

\[
\frac{175\text{ m}}{9\text{ sec}} \times \frac{4\text{ sec}}{1} = \frac{700\text{ m}}{9} = 77.\overline{7}\text{ m}
\]

Answer: 78 m

Exact vs Rounded Answers

One Third = 1/3
On Calculator: 0.33333333
or 0.3

Gears

\[
(\text{Shaft Speed}_1)(\text{# Teeth}_1) = (\text{Shaft Speed}_2)(\text{# Teeth}_2)
\]

\[
\frac{S_1 \times T_1}{S_2} = \frac{S_2 \times T_2}{S_2}
\]

\[
\frac{S_1 \times T_1}{S_2} = T_2
\]

Gears

\[
(\text{Shaft Speed}_1)(\text{# Teeth}_1) = (\text{Shaft Speed}_2)(\text{# Teeth}_2)
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