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

$\approx$ 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

Multiple % Discounts

Original marked down by 20%

You pay 80%

With additional 60% off

You pay 40%

Example:

Original Price is $100

$100 * 0.80 * 0.40 = $100 * 0.32 = $32

Multiple Percent 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?

Answer:

= (100%-20%) * (100%-60%)

= 0.8 * 0.4 = 0.32

= 32%

Weighted Percent

Total = (Weight * Score) + (Weight * Score) + …
- **Homework** : 40%
- **Class Preparation and Participation:** 10%
- **Quizzes:** 25%
- **Tests:** 16%
- **Final:** 9%

Total = (0.40*HW) + (0.10*Class) + (0.25*Quiz) + (0.16*Test) + (0.09*Final)

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 are your worst and best possible grades?

Final is 25% so everything else is 75%

Worst grade = 0.75 * 0.83 = 0.6225 = 62.25%

Best grade = 0.6225 + 0.25 = 0.8725 = 87.25%

Note: Grade = (0.75 * 0.83) + (0.25 * FinalExam)

Weighted Percent

You have a 83% average before the final exam. Final 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)

0.1775 = (0.25 * FinalExam)

FinalExam = 0.1775/0.25 = 0.71 = 71%

Units

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

$$\frac{70km}{1\,hr} * \frac{1000m}{1km} * \frac{1\,hr}{60\,min} * \frac{1\,min}{60sec}$$

$$\frac{70}{1} * \frac{1000m}{1} * \frac{1}{60} * \frac{1}{60sec} = \frac{70000m}{3600sec}$$

$$\frac{700}{36}\,m/sec = \frac{175}{9}m/sec$$

Units

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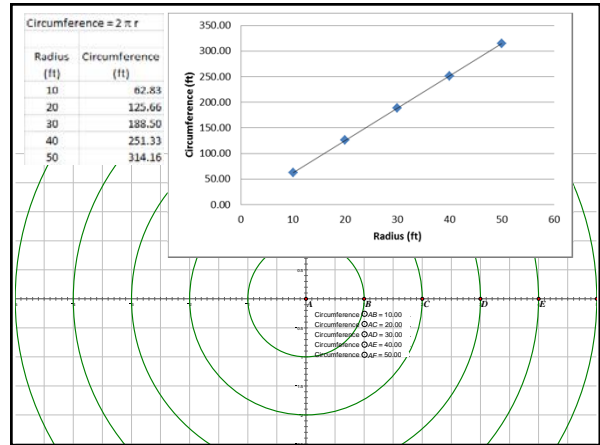How far, in meters, does it travel in 4 seconds?

$$\frac{175}{9}m/sec$$

In 4 seconds:

$$\frac{175m}{9sec} * \frac{4sec}{1} = \frac{700m}{9} = 77.\overline{7}m$$

Answer: 78m

Exact vs Rounded Answers

One Third = 1/3

On Calculator: 0.33333333

or $0.\overline{3}$

Gears

(Shaft Speed$_1$)(# Teeth$_1$) = (Shaft Speed$_2$)(# Teeth$_2$)

$$S1 * T1 = S2 * T2$$

$$\frac{S1 * T1}{S2} = \frac{S2 * T2}{S2}$$

$$\frac{S1 * T1}{S2} = T2$$

Gears

(Shaft Speed$_1$)(# Teeth$_1$) = (Shaft Speed$_2$)(# Teeth$_2$)

Shaft			Axle	
S1	T1	=	S2	T2
Speed	# Teeth		# Teeth	Speed
100	300	=	300	100
100	300	=	150	200
100	300	=	100	300
100	300	=	75	400
100	300	=	60	500