### **Quantitative Skills & Reasoning - Math 1001**

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### Review: Finding the Percent of the Total

To find the percent of a total, use the following formula:

$$Percent = \frac{part}{whole}$$

part = Percent x whole

Working with Percents		
88% of the questions on a student's test were correct. There were $50$ questions. How many of the questions were correct?		
A student who scored 88% on the test answered correctly.		

### Review: Percent of Change

Absolute Change =  $|ending\ quantity - starting\ quantity|$ 

$$Relative\ Change = rac{Absolute\ Change}{starting\ quantity}$$

Absolute Change will always be zero or positive and will result in an **increase** or **decrease** of the starting quantity.

Relative Change will be in decimal form. Be sure to convert your answer to a percent.

## Applications of Percent: Discount & Sale Price

The sales tax rate for the state of Washington v	was 8.1%.
What is the state sales tax on a \$4,700 car in W	/ashington?
What is the final cost of the car, including tax?	

### Simple Interest

#### **Definitions**

The **principal** in financial formulas is the balance upon which interest is paid.

**Simple interest** is interest paid only on the original principal, and not on any interest added at later dates.

$$I = P*r*t$$

I = simple interest

P = principal

r= rate

t = time (in years)

Total Value of Account

- 1. Simple interest: Total Value = Principal + Interest = P + Prt = P(1 + rt)
- 2. Compound interest:

$$FV = PV \left(1 + \frac{\mathbf{r}}{n}\right)^{(nt)}$$

Interest at any time t for Compound Interest = FV(at t) - PV

Antonio invests \$9,000 at 3% simple interest for 24 years.  Round your answers to the nearest cent.		
How much interest is earned over the 24 year period?		
How much is in the account at the end of the 24 year period?		

# Simple Interest

	8000 in a savings account that pays 7% simple interest. How long will it take for this value? Round your answer to the nearest tenth.
Answer:	years

Triple in Value?	

### Compound Interest

$$FV = PV \left(1 + \frac{\mathbf{r}}{n}\right)^{(nt)}$$
 Exponent

**Compound interest** is interest paid on both the original principal and on all interest that has been added to the original principal.

FV = accumulated balance after t years (Future Value)

PV = starting principal (Present Value)

r = annual percentage rate (as a decimal)

t = number of years

n = number of compounding periods (e.g. annually, semi-annually, quarterly, monthly, daily)

If \$24,000 is invested in an account for 10 years. Find the value of the investment at the end of 10 years if the interest is:

$$FV = PV\left(1 + \frac{\mathbf{r}}{n}\right)^{(nt)}$$

Round your answers to the nearest cent.

You deposit \$2000 in an account earning 8% interest compounded monthly. How much will you have in the account in 5 years?



Round to the nearest cent.

$$FV = PV \left(1 + \frac{\mathbf{r}}{n}\right)^{(nt)}$$

If \$10,000 is invested in an account for 25 years. Calculate the *total interest earned* at the end of 25 years if the interest is:

$$FV = PV\left(1 + \frac{\mathbf{r}}{n}\right)^{(nt)}$$

Round your answers to the nearest cent.

#### How Much You Need Now to Deposit to Have Future Value

FV = accumulated balance after t years (Future Value)

 $PV = FV\left(1 + \frac{\mathbf{r}}{n}\right)^{(-nt)}$ 

PV = starting principal (Present Value)

r = annual percentage rate (as a decimal)

t = number of years

n = number of compounding periods (e.g. annually, semi-annually, quarterly, monthly, daily)

How much would you need to deposit in an account now in order to have \$4000 in the account in 10 years? Assume the account earns 8% interest compounded monthly. Round to the nearest cent.



$$PV = FV\left(1 + \frac{\mathbf{r}}{n}\right)^{(-nt)}$$

### Finding Payment Amounts

To find the payment amount, we can use the following formula:

PV = Initial Amount

r = annual interest rate

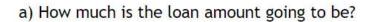
t = time in years

n = payment frequency

PMT = payment

$$PMT = \frac{PV * \left(\frac{r}{n}\right)}{1 - \left(1 + \frac{r}{n}\right)^{(-nt)}}$$

You want to buy a \$225,000 home. You plan to pay 10% as a down payment, and take out a 30 year loan for the rest.



$$PMT = \frac{PV * \left(\frac{r}{n}\right)}{1 - \left(1 + \frac{r}{n}\right)^{(-n)}}$$

b) What will your monthly payments be if the interest rate is 5%?



- c) What are your total payments over the 30 year period? \_\_\_\_\_
- d) How much interest did you pay to the bank? \_\_\_\_\_