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

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

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

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 was 8.1%.

What is the state sales tax on a $4,700 car in Washington?

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:

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

 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

Javier wants to invest $8000 in a savings account that pays 7% simple interest. How long will it take for this investment to double in value? Round your answer to the nearest tenth.

Answer: [   ] years

Triple in Value? [   ]

Compound Interest

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

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:

(a) 6% simple interest: $ _____

(b) 6% compounded annually: $ _____

Round your answers to the nearest cent.

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

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

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Round to the nearest cent.

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

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:

6% simple interest: $\$$ _____

6% compounded monthly: $\$$ _____

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

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 = 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)

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

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.

$ _____

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

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.

a) How much is the loan amount going to be?

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

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

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c) What are your total payments over the 30 year period? _____

d) How much interest did you pay to the bank? _____