If an amount of P dollars is deposited into an investment which grows at an annual rate of r, then after t years, the value of the investment, A, will be

$$A = P(1+r)^t$$
, where *r* has been converted to a decimal

Examples:

[a] Amir deposits \$500 into a savings account which earns 3.1% interest annually. What is the value of his account 4 years later ?

A = P = r = t =

[b] Blanca deposits \$700 into a certificate of deposit (CD) which earns 2.9% interest annually. How many years later will the value of the CD be \$1000 ?

A = P = r = t =

[c] Carla buys a bond which earns 3.4% interest annually. She wants the bond to have a value of \$900 five years later. What is the value of the bond now ?

A = P = r = t =

[d] Dinh deposits \$5000 into a speculative investment, and 6 years later, the investment is worth \$8000. What is the annual growth rate of the investment ?

$$A = P = r = t =$$

[1] Solve the following problems on a <u>separate sheet of paper</u>.

[2] Show your work clearly and neatly.

[3] Summarize each answer in a sentence.

- [a] Isaac was studying for his midterms when he fell asleep. He dreamed that he won \$50,000 in the lottery. He used all his winnings to buy a bond which earned 4.75% annual interest. What was the value of the bond after 20 years ?
- [b] Isaac woke up, and realized he had only been dreaming. He imagined that if he had really won the lottery, he would spend part of his winnings, and save the rest for a future down payment on a house. If Isaac wants to make a down payment of \$30,000 on a house 10 years from now, how much would he need to deposit now into a CD earning 4.25% annual interest ?
- [c] Isaac's sister Sasha won a robotics competition. She used \$10,000 of her prize money to buy stock in her aunt's company, and 5 years later, the stock was worth \$35,000. What was the annual growth rate of the stock ?
- [d] Sasha set aside \$5,000 of her prize money to create a college fund for her nephew. She opened a savings account which earned 3.6% interest annually, and gave her nephew the account when it was valued at \$7,000. How long after the account was opened did Sasha give it to her nephew ?
- [e] When Isaac graduated from college at the age of 22, he received a sculpture from his grandmother as a gift. The value of the sculpture grew by 11% each year. When Isaac got married, the value of the sculpture had doubled since he received it. How old was Isaac when he got married ?

In addition, do the related problems on the Midterm 3 review materials to make sure you are prepared for this type of problem on the midterm.