

If an amount of  $P$  dollars grows at an annual rate of  $r$  (usually given as a percent), then after  $t$  years, the total amount,  $A$ , will be

$$A = P(1 + r)^t, \text{ where } r \text{ has been converted to a decimal}$$

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 ?

$$A = \qquad P = \qquad r = \qquad t =$$

- [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 ?

$$A = \qquad P = \qquad r = \qquad t =$$

- [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 ?

$$A = \qquad P = \qquad r = \qquad t =$$

- [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 ?

$$A = \qquad P = \qquad r = \qquad t =$$

## Homework

- [1] Solve the following problems on a separate sheet of paper.**
- [2] Show your work clearly and neatly.**
- [3] Summarize each answer in a sentence.**

- [a] Yitzhak 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 savings bond which earned 4.75% annual interest. What was the value of the bond after 20 years ?
- [b] Yitzhak woke up, and realized he had only been dreaming. He imagined that if he had really won the lottery, he would give part of his winnings to his mother, and save the rest for a future down payment on a house. If Yitzhak wants to make a down payment of \$40,000 on a house 10 years from now, how much would he need to deposit now into a CD earning 4.25% annual interest ?
- [c] Yitzhak's sister Sasha won a robotics competition. She used \$10,000 of her prize money to buy stock in her aunt's company, and 10 years later, the stock was worth \$35,000. What was the annual growth rate of Sasha's stock ?
- [d] Yitzhak and Sasha's irresponsible cousin Ezra charged a \$7,000 home theatre system to his credit card, then didn't bother to look at or pay his bill. The interest, fees and fines caused his credit card balance to grow by 28% each year. When he finally looked at his bill, the balance was \$19,000. How long after Ezra charged the home theatre system did he finally look at his bill ?
- [e] When Yitzhak 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 Yitzhak got married, the value of the sculpture had doubled since he received it. How old was Yitzhak 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.**