

2.1 Simple Interest

MULTIPLE CHOICE

1. A 5-year bond costs \$4,000 and will pay a total of \$1,200 interest over its lifetime. What is its annual interest rate?
- a. 12%
 - b. 30%
 - c. 6%
 - d. 2%
 - e. 5%

ANS: C PTS: 1 MSC: wcfm04.05.01.17m

2. A \$7,000 loan, taken now, with a simple interest rate of 8% per year, will require a total payment of \$11,480. When will the loan mature?
- a. 18 years
 - b. 6 months
 - c. 8 years
 - d. 6 years
 - e. 20 years

ANS: C PTS: 1 MSC: wcfm04.05.01.19m

3. The simple interest on a \$2,200 loan at 8% per year amounted to \$1,584. When did the loan mature?
- a. 9 years
 - b. 7 years
 - c. 6 months
 - d. 21 years
 - e. 16 years

ANS: A PTS: 1 MSC: wcfm04.05.01.20m

4. Find the simple interest on a \$2,000 investment made for 5 years at an interest rate of 3% per year. What is the future value?
- a. The simple interest is \$320, the future value is \$2,320.
 - b. The simple interest is \$285, the future value is \$2,315.
 - c. The simple interest is \$275, the future value is \$2,275.
 - d. The simple interest is \$300, the future value is \$2,300.
 - e. The simple interest is \$320, the future value is \$2,300.

ANS: D PTS: 1 MSC: wcfm04.05.01.01m

5. Find the simple interest on a \$3,000 investment made for 5 years at an interest rate of 3% per year. What is the future value?
- a. The simple interest is \$470, the future value is \$3,435.
 - b. The simple interest is \$475, the future value is \$3,425.
 - c. The simple interest is \$435, the future value is \$3,435.
 - d. The simple interest is \$470, the future value is \$3,430.

e. The simple interest is \$450, the future value is \$3,450.

ANS: E PTS: 1 MSC: wcfm04.05.01.02m

6. Find the simple interest on a \$27,400 investment made for 3 months at an interest rate of 4% per year. What is the future value?

- a. The simple interest is \$259, the future value is \$27,659.
- b. The simple interest is \$259, the future value is \$27,654.
- c. The simple interest is \$274, the future value is \$27,674.
- d. The simple interest is \$254, the future value is \$27,654.
- e. The simple interest is \$249, the future value is \$27,649.

ANS: C PTS: 1 MSC: wcfm04.05.01.03m

7. Find the simple interest on a \$13,200 investment made for 3 months at an interest rate of 10% per year. What is the future value?

- a. The simple interest is \$345, the future value is \$13,515.
- b. The simple interest is \$330, the future value is \$13,530.
- c. The simple interest is \$355, the future value is \$13,505.
- d. The simple interest is \$350, the future value is \$13,510.
- e. The simple interest is \$330, the future value is \$13,510.

ANS: B PTS: 1 MSC: wcfm04.05.01.04m

8. Your total payment on a 8-year loan, which charged 7.5% simple interest, amounted to \$33,000. How much did you originally borrow? Round your answer to the nearest cent.

- a. $PV = \$20,623.00$
- b. $PV = \$20,625.00$
- c. $PV = \$20,635.00$
- d. $PV = \$20,624.00$
- e. $PV = \$20,630.00$

ANS: B PTS: 1 MSC: wcfm04.05.01.16m

9. At auction on January 11, 1999, 1 year US Treasury Bills were sold at a discount of 5.308%. What was the annual yield rounded to the nearest 0.001%?

- a. $r = 5.506\%$
- b. $r = 5.596\%$
- c. $r = 3.606\%$
- d. $r = 5.606\%$
- e. $r = 6.606\%$

ANS: D PTS: 1 MSC: wcfm04.05.01.21m

10. Given that $FV = 35t + 700$, for what interest rate is this the equation of future value (in dollars) as a function of time t (in years)? (Round your answer to the nearest 0.1%.)

- a. $r = 7.0\%$
- b. $r = 0.5\%$
- c. $r = 3.5\%$
- d. $r = 1.0\%$

e. $r = 5\%$

ANS: E PTS: 1 MSC: wcfm04.05.01.40m

11. You hear on the evening news: "The economy last year grew by 6% from the previous year, and this was the second year in a row in which the economy showed a 6% growth." This means that, in dollar terms, the economy grew more last year than the year before?

- a. Right
b. Wrong

ANS: A PTS: 1 MSC: wcfm04.05.01.42m

12. Find the present value of an investment at 6% annual simple interest which is worth \$50,000 after 20 months. Round your answer to the nearest cent.

- a. $PV = \$45,459.65$
b. $PV = \$45,455.05$
c. $PV = \$45,453.55$
d. $PV = \$45,464.55$
e. $PV = \$45,454.55$

ANS: E PTS: 1 MSC: wcfm04.05.01.12m

13. Find the present value of an investment at 3.25% annual simple interest which is worth \$6,600 after 4 years. Round your answer to the nearest dollar.

- a. $PV = \$2,870$
b. $PV = \$5,836$
c. $PV = \$6,515$
d. $PV = \$5,839$
e. $PV = \$5,841$

ANS: E PTS: 1 MSC: wcfm04.05.01.07m

14. A 3-year bond costs \$10,000 and will pay a total of \$2,700 in interest over its lifetime. What is its annual interest rate?

- a. $r = 1.27\%$
b. $r = 9\%$
c. $r = 0.270\%$
d. $r = 0.09\%$
e. $r = 900\%$

ANS: B PTS: 1 MSC: wcfm04.05.01.18m

15. At auction on August 18, 2005, 3-month T-bills were sold at a discount of 3.600%. What was the simple annual yield? Round answer to the nearest 0.001%.

- a. $r = 1.037\%$
b. $r = 3.600\%$
c. $r = 3.633\%$
d. $r = 1.000\%$
e. $r = 7.200\%$

ANS: C PTS: 1 MSC: wcfm04.05.01.22m

16. You take out a 2-year, \$5,000 loan at 9% simple annual interest. The lender charges you a \$300 fee. Thinking of the fee as additional interest, what is the actual annual interest rate you will pay? Round answer to the nearest 0.001%.
- $r = 16.000\%$
 - $r = 100.000\%$
 - $r = 12.000\%$
 - $r = 0.147\%$
 - $r = 2.060\%$

ANS: C PTS: 1 MSC: wcfm04.05.01.25m

17. Calculate to the nearest 0.01% your annual loss (on a simple interest basis) if you had bought Apple stock in March, 2000, and sold in January, 2002.

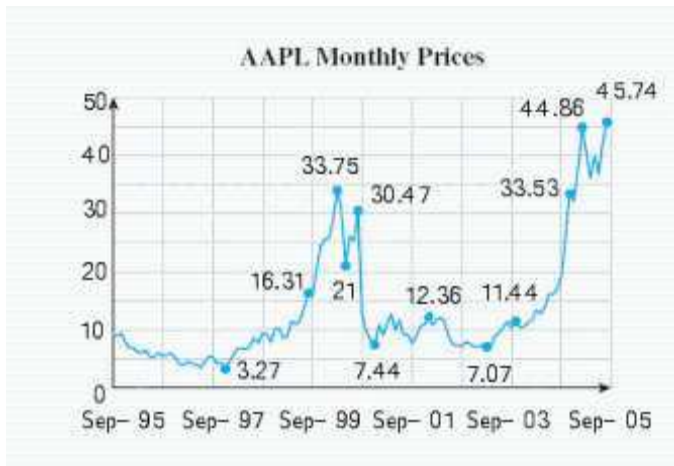
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|----------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Month | Dec. 1997 | Aug. 1999 | Mar. 2000 | May 2000 | Aug. 2000 | Dec. 2000 |
| Monthly Price | 33.65 | 16.31 | 12.38 | 21 | 30.47 | 7.44 |
| Month | Jan. 2002 | Mar. 2003 | Oct. 2003 | Nov. 2004 | Feb. 2005 | Aug. 2005 |
| Monthly Price | 12.36 | 7.07 | 11.44 | 33.53 | 44.86 | 45.74 |

- 2.87%
- 93.71%
- 34.48%
- 83.71%
- 35.48%

ANS: C PTS: 1 MSC: wcfm04.05.01.28m

18. Did Apple's stock undergo simple interest increase in the period December, 1997, through March, 2000?

| | | | | | | |
|----------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Month | Dec. 1997 | Aug. 1999 | Mar. 2000 | May 2000 | Aug. 2000 | Dec. 2000 |
| Monthly Price | 3.27 | 16.31 | 33.75 | 21 | 30.47 | 7.44 |
| Month | Jan. 2002 | Mar. 2003 | Oct. 2003 | Nov. 2004 | Feb. 2005 | Aug. 2005 |
| Monthly Price | 12.36 | 7.07 | 11.44 | 33.53 | 44.86 | 45.74 |



- a. No
- b. Yes

ANS: A PTS: 1 MSC: wcfm04.05.01.31m

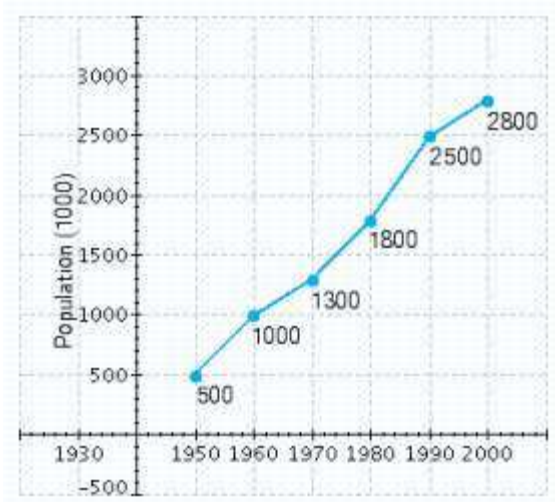
19. If Apple's stock underwent simple interest increase from February, 2005, through August, 2005 and into 2006, what would the price be in December, 2006? Round your answer to the nearest cent.

| | | | | | | |
|----------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Month | Dec. 1997 | Aug. 1999 | Mar. 2000 | May 2000 | Aug. 2000 | Dec. 2000 |
| Monthly Price | 3.28 | 16.31 | 33.95 | 21 | 30.47 | 7.44 |
| Month | Jan. 2002 | Mar. 2003 | Oct. 2003 | Nov. 2004 | Feb. 2005 | Aug. 2005 |
| Monthly Price | 12.36 | 7.07 | 11.44 | 33.53 | 44.75 | 45.78 |

- a. \$48.53
- b. \$47.82
- c. \$48.87
- d. \$48.43
- e. \$49.53

ANS: A PTS: 1 MSC: wcfm04.05.01.32m

20. At what annual (simple interest) rate did the population of some county increase from 1950 to 1980? Round your answer to one decimal place.



- $r = 7.7\%$
- $r = 8.7\%$
- $r = 10.2\%$
- $r = 9.8\%$
- $r = 8.5\%$

ANS: B

PTS: 1

MSC: wcfm04.05.01.33m

NUMERIC RESPONSE

- A two-year bond has a maturity value of \$5,000 and will pay a total of \$1,550 interest over its lifetime. What is the annual interest rate rounded to the nearest 0.1%?

$r = \underline{\hspace{2cm}}$ %

ANS: 15.5

PTS: 1

MSC: wcfm04.05.01.17

- A \$9,000 loan, taken now, with a simple interest rate of 9% per year, will cost a total of \$16,290. How many years until the loan matures? (Round your answer to the nearest whole year.)

$t = \underline{\hspace{2cm}}$ years

ANS: 9

PTS: 1

MSC: wcfm04.05.01.19

- The simple interest on a \$17,000 loan, at 4% per year, amounted to \$5,610. When did the loan mature? (Round your answer to the nearest whole month.)

$t = \underline{\hspace{2cm}}$ months

ANS: 99

PTS: 1

MSC: wcfm04.05.01.20

4. At auction on January 11, 1999, 1 year US Treasury Bills were sold at a discount of 5.388%. What was the annual yield rounded to the nearest 0.001%?

$r =$ _____ %

ANS: 5.695

PTS: 1 MSC: wcfm04.05.01.21

5. Given that $FV = 22t + 550$, for what interest rate is this the equation of future value (in dollars) as a function of time t (in years)? (Round your answer to the nearest 0.1%.)

_____ %

ANS: 4.0

PTS: 1 MSC: wcfm04.05.01.40

6. A 7-year bond costs \$20,000 and will pay a total of \$2,800 in interest over its lifetime. What is its annual interest rate? Round answer to the nearest whole number.

_____ %

ANS: 2

PTS: 1 MSC: wcfm04.05.01.18

7. At auction on August 18, 2005, 3-month T-bills were sold at a discount of 3.580%. What was the simple annual yield? Round answer to the nearest 0.001%.

_____ %

ANS: 3.612

PTS: 1 MSC: wcfm04.05.01.22

8. You take out a 4-year, \$5,000 loan at 7% simple annual interest. The lender charges you a \$200 fee. Thinking of the fee as additional interest, what is the actual annual interest rate you will pay? Round answer to the nearest whole number.

_____ %

ANS: 8

PTS: 1 MSC: wcfm04.05.01.25

9. Calculate to the nearest 0.01% your annual loss (on a simple interest basis) if you had bought Apple stock in March, 2000, and sold in January, 2002.

| | | | | | | |
|----------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Month | Dec. 1997 | Aug. 1999 | Mar. 2000 | May 2000 | Aug. 2000 | Dec. 2000 |
| Monthly Price | 33.90 | 16.31 | 12.34 | 21 | 30.47 | 7.44 |
| Month | Jan. 2002 | Mar. 2003 | Oct. 2003 | Nov. 2004 | Feb. 2005 | Aug. 2005 |

| | | | | | | |
|----------------------|-------|------|-------|-------|-------|-------|
| Monthly Price | 12.36 | 7.07 | 11.44 | 33.53 | 44.86 | 45.74 |
|----------------------|-------|------|-------|-------|-------|-------|

_____ %

ANS: -34.69

PTS: 1

MSC: wcfm04.05.01.28

10. If Apple's stock underwent simple interest increase from February, 2005, through August, 2005 and into 2006, what would the price be in December, 2006? Round your answer to the nearest cent.

| | | | | | | |
|----------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Month | Dec. 1997 | Aug. 1999 | Mar. 2000 | May 2000 | Aug. 2000 | Dec. 2000 |
| Monthly Price | 3.28 | 16.31 | 33.95 | 21 | 30.47 | 7.44 |
| Month | Jan. 2002 | Mar. 2003 | Oct. 2003 | Nov. 2004 | Feb. 2005 | Aug. 2005 |
| Monthly Price | 12.36 | 7.07 | 11.44 | 33.53 | 44.74 | 45.72 |

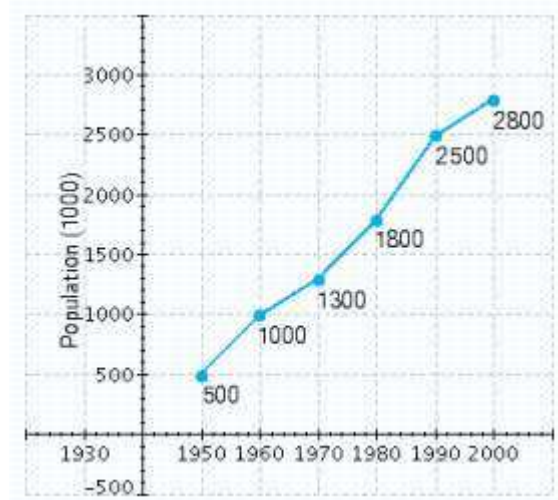
\$ _____

ANS: 48.33

PTS: 1

MSC: wcfm04.05.01.32

11. At what annual (simple interest) rate did the population of some county increase from 1970 to 1990? Round your answer to one decimal place.



_____ %

ANS: 4.6

PTS: 1

MSC: wcfm04.05.01.33

SHORT ANSWER

1. Find the simple interest on a \$4,000 investment made for 20 years at an interest rate of 5% per year. What is the future value?

$$INT = \$ \underline{\hspace{2cm}}$$

$$FV = \$ \underline{\hspace{2cm}}$$

ANS:
4,000; 8,000

PTS: 1 MSC: wcfm04.05.01.02

2. Find the simple interest on a \$2,000 investment made for 1 year at an interest rate of 7% per year. What is the future value?

$$INT = \$ \underline{\hspace{2cm}}$$

$$FV = \$ \underline{\hspace{2cm}}$$

ANS:
140; 2,140

PTS: 1 MSC: wcfm04.05.01.01

3. Find the simple interest on a \$5,000 investment made for 6 months at an interest rate of 8% per year. What is the future value?

$$INT = \$ \underline{\hspace{2cm}}$$

$$FV = \$ \underline{\hspace{2cm}}$$

ANS:
200; 5,200

PTS: 1 MSC: wcfm04.05.01.03

4. Find the simple interest on a \$1,700 investment made for 3 months at an interest rate of 13% per year. What is the future value?

$$INT = \$ \underline{\hspace{2cm}}$$

$$FV = \$ \underline{\hspace{2cm}}$$

ANS:
55.25; 1,755.25

PTS: 1 MSC: wcfm04.05.01.04

5. Your total payment on a 4-year loan, which charged 9% simple interest, amounted to \$34,000. How much did you originally borrow? Round your answer to the nearest cent.

\$_____

ANS:
 $PV = \$25,000.00$

PTS: 1 MSC: wcfm04.05.01.16

6. Find the present value of an investment at 5% annual simple interest which is worth \$6,600 after 6 years. Round your answer to the nearest dollar.

\$ _____

ANS:
 $PV = \$5,077$

PTS: 1 MSC: wcfm04.05.01.07

7. Find the present value of an investment at 6% annual simple interest which is worth \$30,000 after 30 months. Round your answer to the nearest cent.

\$ _____

ANS:
 $PV = \$26,086.96$

PTS: 1 MSC: wcfm04.05.01.12

ESSAY

1. You hear on the evening news: "The economy last year grew by 7% from the previous year, and this was the second year in a row in which the economy showed a 7% growth." *This means that, in dollar terms, the economy grew more last year than the year before.* **Why?**

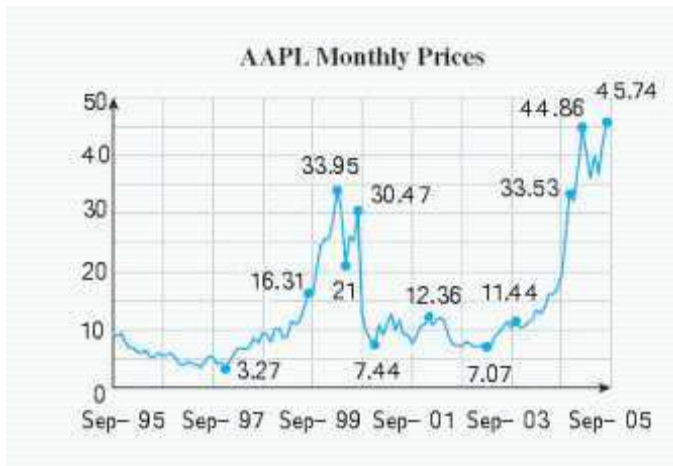
ANS:

The dollar value last year was more than the year before. So, 7% of last year's dollar is larger than 7% of the year before.

PTS: 1 MSC: wcfm04.05.01.42

2. Did Apple's stock undergo simple interest increase in the period December, 1997, through March, 2000? (Give a reason for your answer.)

| | | | | | | |
|----------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Month | Dec. 1997 | Aug. 1999 | Mar. 2000 | May 2000 | Aug. 2000 | Dec. 2000 |
| Monthly Price | 3.27 | 16.31 | 33.95 | 21 | 30.47 | 7.44 |
| Month | Jan. 2002 | Mar. 2003 | Oct. 2003 | Nov. 2004 | Feb. 2005 | Aug. 2005 |
| Monthly Price | 12.36 | 7.07 | 11.44 | 33.53 | 44.86 | 45.74 |



ANS:

No. Simple interest increase is linear. The graph is visibly not linear in that time period. Further, we can compare slopes between marked points to see if the slope remained roughly constant: From

December 1997 to August 1999 the slope was $\frac{(16.31 - 3.27)}{\left(\frac{20}{12}\right)} = 7.824$ while, from August 1999 to

March 2000 the slope was $\frac{(33.95 - 16.31)}{\left(\frac{7}{12}\right)} = 30.24$. These slopes are quite different.

PTS: 1

MSC: wcfm04.05.01.31