

**GRADE 11 ESSENTIAL  
MATHEMATICS  
UNIT B  
INTEREST WORKBOOK**

# Lesson 1 Simple Interest

PRE-ALGEBRA

NAME \_\_\_\_\_

If the rate of interest is 12% a year, what will the interest be on a \$300 loan for  $1\frac{1}{2}$  years?

*interest = principal × rate × time (in years)*

$$\begin{aligned}
 i &= p \times r \times t \\
 &= 300 \times 0.12 \times 1\frac{1}{2} \\
 &= 36 \times 1\frac{1}{2} \\
 &= 54
 \end{aligned}$$

The interest will be \$\_\_\_\_\_.

If the rate of interest is  $9\frac{1}{2}\%$  a year, what will the interest be on a \$100 loan for 2 years?

$$\begin{aligned}
 i &= p \times r \times t \\
 &= \_\_\_\_ \times \_\_\_\_ \times \_\_\_\_ \\
 &= \_\_\_\_ \times \_\_\_\_ \\
 &= \_\_\_\_
 \end{aligned}$$

The interest will be \$\_\_\_\_\_.

CHAPTER 6

Find the interest for each loan described below.

|     | principal | rate              | time                 | interest |
|-----|-----------|-------------------|----------------------|----------|
| 1.  | \$250     | 10%               | 2 years              |          |
| 2.  | \$400     | 12%               | 2 years              |          |
| 3.  | \$550     | 8%                | $1\frac{1}{4}$ years |          |
| 4.  | \$650     | $11\frac{1}{2}\%$ | 3 years              |          |
| 5.  | \$600     | 16%               | 3 years              |          |
| 6.  | \$500     | $11\frac{1}{4}\%$ | 1 year               |          |
| 7.  | \$1500    | 15%               | $1\frac{1}{3}$ years |          |
| 8.  | \$1000    | $12\frac{1}{2}\%$ | 3 years              |          |
| 9.  | \$2890    | 14%               | $2\frac{1}{2}$ years |          |
| 10. | \$2600    | 9%                | $2\frac{1}{2}$ years |          |

# Lesson 1 Problem Solving

PRE-ALGEBRA

Solve each problem.

1. Mr. Wilkinson borrowed \$600 for  $1\frac{1}{2}$  years. He is to pay 9% annual interest. How much interest is he to pay?

He will pay \$\_\_\_\_\_ interest.

2. Hillary had \$350 in a savings account for  $\frac{1}{2}$  year. Interest was paid at an annual rate of 5%. How much interest did she receive?

She received \$\_\_\_\_\_ interest.

3. Suppose you deposit \$700 in a savings account at  $5\frac{1}{2}\%$  interest. How much interest will you receive in one year?

You will receive \$\_\_\_\_\_.

4. The Tremco Company borrowed \$10 000 at 12% annual interest for a 1-year period. How much interest did the company have to pay? What was the total amount (principal + interest) the company needed to repay the loan?

The company had to pay \$\_\_\_\_\_ interest.

The total amount needed was \$\_\_\_\_\_.

5. Ian borrowed \$700 for 1 year. Interest on the first \$300 of the loan was 18%, and interest on the remainder of the loan was 12%. How much interest did he pay?

He paid \$\_\_\_\_\_ interest.

6. Molly's mother borrowed \$460 at 10% annual interest. What would be the interest if the loan were repaid after  $\frac{1}{2}$  year? What would the interest be if the loan were repaid after  $\frac{3}{4}$  year?

The interest would be \$\_\_\_\_\_ for  $\frac{1}{2}$  year.

The interest would be \$\_\_\_\_\_ for  $\frac{3}{4}$  year.

## Lesson 2 Simple Interest

PRE-ALGEBRA

NAME \_\_\_\_\_

\$36 interest is paid in 2 years at a flat rate of 9%. Find the principal.

$$i = p \times r \times t$$

$$36 = p \times 0.09 \times 2$$

$$36 = 0.18p$$

$$\frac{36}{0.18} = p$$

$$200 = p$$

The principal is \$ 200.00.

\$16 interest is paid in 2 years on \$100 principal. Find the rate.

$$i = p \times r \times t$$

$$16 = 100 \times r \times 2$$

$$16 = 200r$$

$$\frac{16}{200} = r$$

$$0.08 = r$$

The rate is 8 %.

\$50 interest is paid on \$200 principal at a rate of 10%. Find the time.

$$i = p \times r \times t$$

$$50 = 200 \times 0.10 \times t$$

$$50 = 20t$$

$$\frac{50}{20} = t$$

The time is 2.5 years.

CHAPTER 6

Complete the following.

|     | principal | rate             | time                 | interest |
|-----|-----------|------------------|----------------------|----------|
| 1.  |           | 7%               | 3 years              | \$21     |
| 2.  | \$325     |                  | $1\frac{1}{2}$ years | \$39     |
| 3.  | \$375     | 10%              |                      | \$18.75  |
| 4.  | \$780     | 15%              | 2 years              |          |
| 5.  | \$1200    | 9%               |                      | \$216    |
| 6.  | \$1400    |                  | $1\frac{1}{2}$ years | \$168    |
| 7.  |           | $8\frac{1}{2}$ % | $1\frac{1}{2}$ years | \$446.25 |
| 8.  | \$8000    |                  | $2\frac{1}{2}$ years | \$1500   |
| 9.  | \$18 050  | 12%              |                      | \$6498   |
| 10. | \$25 000  | 15%              | 3 years              |          |

## Lesson 2 Problem Solving

PRE-ALGEBRA

Solve each problem.

1. Mrs. Vernon paid \$72 interest for a 2-year loan at 9% annual interest. How much money did she borrow?

She borrowed \$ \_\_\_\_\_.

2. Matthew paid \$63 interest for a \$350 loan for  $1\frac{1}{2}$  years. What was the rate of interest?

The rate of interest was \_\_\_\_\_ %.

3. Suppose you borrow \$600 at 10% interest. What period of time would you have the money if the interest is \$30?

The period of time would be \_\_\_\_\_ year.

4. Albertito had \$740 in a savings account at 5% interest. The money was in the account for  $\frac{1}{4}$  year. How much interest did he receive? Suppose he withdrew the principal and interest after  $\frac{1}{4}$  year. How much money would he withdraw from the account?

He received \$ \_\_\_\_\_ interest.

He would withdraw \$ \_\_\_\_\_ from the account.

5. How much must you deposit at  $5\frac{1}{2}$ % annual interest in order to earn \$33 in 1 year?

You would need \$ \_\_\_\_\_ in the account.

6. The interest on a \$300 loan for 2 years is \$90. What rate of interest is charged?

The rate of interest is \_\_\_\_\_ %.

7. How much must you have on deposit at  $6\frac{1}{2}$ % of annual interest in order to earn \$221 in a year?

You would have to deposit \$ \_\_\_\_\_.

### Lesson 3 Compound Interest

Interest paid on the original principal and the interest already earned is called **compound interest**.

Bev had \$400 in a savings account for 3 years that paid 6% interest compounded annually. What was the total amount in her account at the end of the third year?

**At the end of 1 year:**

$$\text{interest} = 400 \times 0.06 \times 1 = 24.00 \text{ or } \$24$$

↓

$$\text{new principal} = 400 + 24 = 424 \text{ or } \$424$$
  

**At the end of 2 years:**

$$\text{interest} = 424 \times 0.06 \times 1 = 25.44 \text{ or } \$25.44$$

↓

$$\text{new principal} = 424 + 25.44 = 449.44 \text{ or } \$449.44$$
  

**At the end of 3 years:**

$$\text{interest} = 449.44 \times 0.06 \times 1 = 26.9664 \text{ or } \$26.97$$

↓

$$\text{total amount} = 449.44 + 26.97 = 476.41 \text{ or } \$476.41$$

CHAPTER 6

Assume interest is compounded annually. Find the total amount for each of the following.

|    | principal | rate             | time    | total amount |
|----|-----------|------------------|---------|--------------|
| 1. | \$500     | 6%               | 2 years |              |
| 2. | \$700     | $5\frac{1}{2}\%$ | 2 years |              |
| 3. | \$800     | 5%               | 3 years |              |
| 4. | \$800     | $6\frac{1}{2}\%$ | 3 years |              |
| 5. | \$200     | 9%               | 3 years |              |
| 6. | \$1000    | 8%               | 2 years |              |

### Lesson 3 Problem Solving

Solve each problem.

- Heidi had \$600 in a savings account for 2 years. Interest was paid at the rate of 6% compounded annually. What was the total amount in her account at the end of 2 years?

The total amount was \$\_\_\_\_\_.

- Travis deposited \$400 in an account that pays 5% interest compounded annually. What will be the total amount in his account after 2 years? After 3 years?

It will be \$\_\_\_\_\_ after 2 years.

It will be \$\_\_\_\_\_ after 3 years.

- Aubrey deposited \$300 in an account that pays 7% interest compounded annually. Tori deposited \$300 in an account at an annual rate of 7% (simple interest). After 3 years what will be the total amount in Aubrey's account? In Tori's account?

Aubrey's account will have \$\_\_\_\_\_.

Tori's account will have \$\_\_\_\_\_.

- Ms. Sanchez has \$500 in her savings account, which pays 5% interest compounded annually. What will be the value of the account after 3 years?

The value will be \$\_\_\_\_\_.

- Landon deposited \$300 at 6% interest compounded annually. Elisa deposited \$200 at  $6\frac{1}{2}\%$  interest compounded annually. Who will have the greater account after 3 years? How much greater will it be?

\_\_\_\_\_ will have the greater account.

It will be \$\_\_\_\_\_ greater.

### Lesson 4 Compound Interest

Interest may be paid annually (each year), semiannually (twice a year), quarterly (four times a year), monthly (every month), or daily (every day).

Ed had \$100 in an account for  $1\frac{1}{2}$  years that paid 6% interest compounded semiannually. What was the total amount in his account at the end of  $1\frac{1}{2}$  years?

**At the end of  $\frac{1}{2}$  year:**

$$\text{interest} = 100 \times 0.06 \times \frac{1}{2} = 3.00 \text{ or } \$3$$

$$\text{new principal} = 100 + 3 = 103 \text{ or } \$103$$

**At the end of 1 year:**

$$\text{interest} = 103 \times 0.06 \times \frac{1}{2} = 3.09 \text{ or } \$3.09$$

$$\text{new principal} = 103 + 3.09 = 106.09 \text{ or } \$106.09$$

**At the end of  $1\frac{1}{2}$  years:**

$$\text{interest} = 106.09 \times 0.06 \times \frac{1}{2} = 3.1827 \text{ or } \$3.18$$

$$\text{total amount} = \underline{\hspace{2cm}} + \underline{\hspace{2cm}} = \underline{\hspace{2cm}} \text{ or } \$\underline{\hspace{2cm}}$$

CHAPTER 6

Find the total amount for each of the following.

|    | principal | rate | time                 | compounded   | total amount |
|----|-----------|------|----------------------|--------------|--------------|
| 1. | \$200     | 6%   | $1\frac{1}{2}$ years | semiannually |              |
| 2. | \$300     | 5%   | 2 years              | semiannually |              |
| 3. | \$100     | 5%   | 1 year               | quarterly    |              |
| 4. | \$400     | 7%   | $\frac{3}{4}$ year   | quarterly    |              |
| 5. | \$500     | 8%   | 4 months             | monthly      |              |
| 6. | \$600     | 9%   | $\frac{1}{4}$ year   | monthly      |              |

### Lesson 4 Problem Solving

Solve each problem.

1. Mrs. Fauler had \$600 in a savings account that paid 5% interest compounded semiannually. What was the value of her account after  $1\frac{1}{2}$  years?

The value was \$\_\_\_\_\_.

2. How much interest would \$3000 earn in two years at 7% interest compounded semiannually?

It would earn \$\_\_\_\_\_ interest.

3. Suppose \$100 were deposited in each savings account with rates of interest as follows:  
 Account A—6% compounded annually  
 Account B—6% compounded semiannually  
 Account C—6% compounded quarterly  
 What would be the value of each account after 1 year?

\$\_\_\_\_\_ will be in account A.

\$\_\_\_\_\_ will be in account B.

\$\_\_\_\_\_ will be in account C.

4. Assume \$200 was deposited in a 2-year account at 9%. How much more interest would be in the account if the interest were compounded annually rather than computed as simple interest?

There would be \$\_\_\_\_\_ more in the account.

5. Account A has \$500 at 8% interest compounded quarterly. Account B has \$500 at 8% interest compounded semiannually. Which account will have a greater amount of money after 1 year? How much more?

Account \_\_\_\_\_ will have more money.

It will have \$\_\_\_\_\_ more.

**CHAPTER 6 PRACTICE TEST**  
Simple/Compound Interest

NAME \_\_\_\_\_

Complete the following for simple interest.

|    | principal | rate             | time               | interest |
|----|-----------|------------------|--------------------|----------|
| 1. | \$150     | 15%              | 3 years            |          |
| 2. | \$700     | $8\frac{1}{2}\%$ | 2 years            |          |
| 3. | \$645     |                  | $\frac{1}{4}$ year | \$19.35  |
| 4. | \$540     | 10%              |                    | \$135.00 |
| 5. |           | $9\frac{1}{2}\%$ | 2 years            | \$729.60 |
| 6. | \$1800    |                  | 2 years            | \$540.00 |

CHAPTER  
6

Interest is to be compounded in each account below. Find the total amount that will be in each account after the period of time indicated.

|     | principal | rate | time               | compounded   | total amount |
|-----|-----------|------|--------------------|--------------|--------------|
| 7.  | \$300     | 7%   | 2 years            | annually     |              |
| 8.  | \$600     | 5%   | 3 years            | annually     |              |
| 9.  | \$500     | 6%   | 2 years            | semiannually |              |
| 10. | \$400     | 9%   | $\frac{1}{4}$ year | monthly      |              |

**GRADE 11 ESSENTIAL  
UNIT B - INTEREST AND CREDIT**

**INTEREST WORKBOOK ANSWER KEY**

These are the answers (not the full solutions) to the PRISM Purple Workbook 'Chapter 6' Simple and Compound Interest.

Apologies in advance if there are a couple errors in the given answers.

**PRETEST**

Successful completion on first try of this pre-test is a good clue you likely do not need to do much of the full workbook!

1. \$22.40
2. \$8.25
3. 1 Year
4. 4%
5. \$600
6. 9%
7. \$224.72
8. \$115.76
9. \$337.46
10. \$420.38

**LESSON 1 SIMPLE INTEREST**

Calculating the Interest and Total Amount using  $A = P + I$  &  $I = Prt$

Example 1: The interest will be \$54

Example 2: The interest will be \$19

1. \$50
2. \$96
3. \$55
4. \$224.25
5. \$288
6. \$56.25
7. \$300
8. \$375
9. \$1011.50
10. \$585.00

**Lesson 1 Problem Solving**

1. \$81
2. \$8.75
3. \$38.50
4. \$1,200 ; \$11,200
5. \$102
6. \$23; \$34.50

**Lesson 2 Simple Interest**

(solving for all variables in  $I = Prt$ ) (ie: Algebra)

Example 1:  $P = \$200$ ; Example 2:  $r = 8\%$ ; Example 3:  $t = 2.5$  years

1. \$100
2. 8%
3.  $\frac{1}{2}$  year
4. \$234
5. 2 years
6. 8%
7. \$3,500
8. 7.5%
9. 3 years
10. \$11,250

**Lesson 2 Problem Solving**

Solve for different variables in  $I = Prt$

1. \$400
2. 12%
3.  $\frac{1}{2}$  year
4. \$9.25; \$749.25
5. \$600
6. 15%
7. \$3,400

**LESSON 3 COMPOUND INTEREST**

Calculating Interest Compounded Annually using iterations (recursion);  
ie: year by year

Do at least half the questions recursively (ie: year by year) in a table.

**Example:** \$476.41

1. \$561.80
2. \$779.12
3. \$926.10
4. \$966.36
5. \$259.01
6. \$1166.40

There is an easier way to do this! Try using the easier Compound Interest formula instead of the year by year iterative (ie: step by step) method.

**Lesson 3 Problem Solve**

1. \$674.16
2. \$441; \$463.05
3. \$367.52; \$363.00
4. 578.81
5. Landon: \$357.30; Elisa: \$241.59; difference: \$115.70

**LESSON 4 COMPOUND INTEREST**

Now calculating the Total Amount of the loan or investment for shorter compounding periods

Twice per year = semi-annual interest payments

Four times per year = quarterly interest payments

12 times per year = Monthly; Daily = 365 times/yr; etc.

Lots more lines to calculate if doing it period by period in a recursive (iterative) manner in rows in a table. Two lines per year if semi-annual, four lines per year if quarterly, etc

Do at least half the questions recursively (ie: period by period) in a table.

Example:  $106.09 + 3.18 = \$109.27$

- |             |             |             |
|-------------|-------------|-------------|
| 1. \$218.54 | 2. \$331.14 | 3. \$105.09 |
| 4. \$421.37 | 5. \$513.47 | 6. \$613.60 |

Of course, for lots of periods and years you will want to use the proper Compound Interest Formula.

**LESSON 4 Problem Solving**

Solving for the Total Amount due or interest earned in a compounding loan or investment.

1. \$646.54
2. \$442.57
3. \$106 ; \$106.09; \$106.14 (wow! Big deal!)
4. \$1.62
5. Account A will have more money. It will have \$0.42 more

Of course using the proper compound interest formula would be the smart way to do these. Or an App on your device.

**PRACTICE TEST**

Of course I will have some Simple and Compound Interest Questions on my own test!

- |             |             |             |              |
|-------------|-------------|-------------|--------------|
| 1. \$67.50  | 2. \$119    | 3. 12%      | 4. 2.5 years |
| 5. \$3,840  | 6. 15%      |             |              |
| 7. \$343.47 | 8. \$694.58 | 9. \$562.75 | 10. \$409.07 |