

Independent and Dependent Variables

Recall that a set of ordered pairs is called a *relation*. A relation can also be represented by a verbal description, an equation, a table, or a graph.

The value of the variable that is subject to choice in a relation is called the *independent variable*. The variable with a value that depends on the value of the independent variable is called the *dependent variable*. The domain contains values of the independent variable, while the range contains the values of the dependent variable.

Example 1 Identify Variables

Identify the independent and dependent variables for each relation.

- a. **DANCE** The dance committee is selling tickets to the Fall Ball. The more tickets that they sell increases the amount of money they can spend for decorations.

The number of tickets sold is the independent variable because it is unaffected by the money spent on decorations. The amount of money spent on decorations is the dependent variable because it is affected by the number of tickets sold.

- b. **MOVIES** Generally, the average price of going to the movies has steadily increased over time.

Time is the independent variable because it is unaffected by the cost of attending the movies. The price of going to the movies is the dependent variable because it is affected by time.

Exercises

Identify the independent and dependent variables for each relation.

1. The air pressure inside a tire increases with the temperature.
2. As the amount of rain decreases, so does the water level of the river.
3. Increasing the temperature of a compound increases the pressure.
4. Mike's cell phone is part of a family plan. If he uses more minutes than his share, then there are fewer minutes available for the rest of her family.
5. Julian is buying concert tickets for him and his friends. The more concert tickets he buys the greater the cost.
6. A store is having a sale over Labor Day weekend. The more customers that purchase something from the store, the greater the profits will be.
7. The Spanish classes are having a fiesta lunch. Each student that attends is to bring a Spanish side dish or dessert. The more students that attend, the more food there will be.
8. The faster you drive your car, the longer it will take to come to a complete stop.

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Answers

- 1.** I: the temperature, D: the air pressure
- 2.** I: the amount of rain, D: the water level
- 3.** I: the temperature of the compound; D: the pressure of the compound
- 4.** I: the number of minutes Mike uses on her cell phone, D: the number of minutes that are left
- 5.** I: number of concert tickers, D: cost of tickets
- 6.** I: number of customers who purchase something, D: the profits
- 7.** I: the number of students who attend the fiesta; D: the amount of food that there will be at the fiesta
- 8.** I: the speed of the car; D: the length of time it takes to stop the car