

# Proportional and Nonproportional Relationships – L1-4

Two related quantities are **proportional** if they have a constant ratio between them. If two related quantities do not have a constant ratio, then they are **nonproportional**.

**Equivalent Ratios:** Ratios that have the same value.

### Example 1

The cost of one CD at a record store is \$12. Create a table to show the total cost for different numbers of CDs. Is the total cost proportional to the number of CDs purchased?

Number of CDs	1	2	3	4
Total Cost	\$12	\$24	\$36	\$48

$$\frac{\text{Total Cost}}{\text{Number of CDs}} = \frac{12}{1} = \frac{24}{2} = \frac{36}{3} = \frac{48}{4} = \$12 \text{ per CD}$$

Divide the total cost for each by the number of CDs to find a ratio. Compare the ratios.

Since the ratios are the same, the total cost is proportional to the number of CDs purchased.

### Example 2

The cost to rent a lane at a bowling alley is \$9 per hour plus \$4 for shoe rental. Create a table to show the total cost for each hour a bowling lane is rented if one person rents shoes. Is the total cost proportional to the number of hours rented?

Number of Hours	1	2	3	4
Total Cost	\$13	\$22	\$31	\$40

$$\frac{\text{Total Cost}}{\text{Number of Hourse}} \rightarrow \frac{13}{1} \text{ or } 13 \quad \left| \quad \frac{22}{2} \text{ or } 11 \quad \left| \quad \frac{31}{3} \text{ or } 10.34 \quad \left| \quad \frac{40}{4} \text{ or } 10$$

Divide each cost by the number of hours.

Since the ratios are not the same, the total cost is nonproportional to the number of hours rented with shoes.

### Example 3

A photo developer charges \$0.25 per photo developed. Is the total cost proportional to the number of photos developed? (Hint: Make a table)

# of Photos	1	2	3	4
Total Cost	\$0.25	\$0.50	\$0.75	\$1.00

yes

$$\frac{\text{Total Cost}}{\# \text{ of Photos}} \rightarrow \frac{0.25}{1} = \frac{0.50}{2} = \frac{0.75}{3} = \frac{1.00}{4} = \$0.25 \text{ per photo}$$