

Lesson 4 Reteach

Proportional and Nonproportional Relationships

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**.

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

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

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.

Exercises

1. **PICTURES** A photo developer charges \$0.25 per photo developed. Is the total cost proportional to the number of photos developed? **Yes**

Number of Photos	1	2	3	4
Total Cost (\$)	0.25	0.50	0.75	1.00

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

2. **SOCCER** A soccer club has 15 players for every team, with the exception of two teams that have 16 players each. Is the number of players proportional to the number of teams? **no**

Number of Teams	1	2	3	4
Number of Players	16	32	47	62

$$\frac{\text{Number of Teams}}{\text{Number of Players}} \rightarrow \frac{16}{1} = \frac{32}{2} \neq \frac{47}{3} \neq \frac{62}{4}$$