Name Key Period _____

Lesson 1.4 Notes (Proportional and Non-proportional Relationships)

Introduction: Ms. Stephens is planning a year-end pizza party for her students. Ace Pizza offers free delivery and charges $8 per medium pizza.

1. Complete the table to determine the cost for different numbers of pizzas ordered.

Cost ($)	8	16	24	32	40
Pizza	1	2	3	4	5

2. For each number of pizzas, write the relationship of the cost and number of pizzas as a unit ratio in *simplest form*.

$\frac{8}{1} = \frac{16}{2} = \frac{24}{3} = \frac{32}{4} = \frac{40}{5} = \frac{\$8}{1 \text{ pizza}} \Rightarrow$ \$8 per pizza

Key Concepts:

- Two quantities are **proportional** if they have a **constant ratio** (or unit rate).
  - For relationships in which this ratio is *not constant*, the two quantities are **non-proportional**.
  - In the pizza example, the cost of an order is *proportional* to the number of pizzas ordered. (constant rate of $8 per pizza)

Practice:

3. Andrew earns $18 per hour for mowing lawns. Is the amount of money he earns proportional to the number of hours he spends mowing? Explain.

Hours	1	2	3	4
Money	\$18	\$36	\$54	\$72

$\frac{18}{1} = \frac{36}{2} = \frac{54}{3} = \frac{72}{4} = 18$

Constant Ratio ⇒ Proportional

4. There are 2 homeroom teachers assigned to every 48 students. Is the number of students at this school proportional to the number of teachers? Explain.

Teachers	2	4	6	8
students	48	96	144	192

$\frac{48}{2} = \frac{96}{4} = \frac{144}{6} = \frac{192}{8} = 24$

Constant Ratio ⇒ Proportional

5. A school charges $7 per baseball game ticket plus a $3 processing fee per order. Is the cost of an order proportional to the number of tickets ordered? Explain.

Cost ($)	10	17	24	31
Tickets Ordered	1	2	3	4

NOT constant ratio ⇒ Non-Proportional

$\frac{10}{1} = 10 \quad \frac{17}{2} = 8.5 \quad \frac{24}{3} = 8 \quad \frac{31}{4} = 7.75$

6. You can use the recipe shown to make a fruit punch. Is the amount of sugar used proportional to the amount of mix used? Explain.

Cups of Sugar	$\frac{1}{2}$	1	$1\frac{1}{2}$	2
Envelopes of Mix	1	2	3	4

Constant Ratio
⇒ Proportional

$\frac{1}{1/2} = 2$ $\frac{2}{1} = 2$ $\frac{3}{1\frac{1}{2}} = 2$ $\frac{4}{2} = 2$

7. At the beginning of the year, Isabel had $120 in the bank. Each week she deposits another $20. Is her account balance proportional to the number of weeks of deposits? Use the table below. Explain.

Time (wk)	1	2	3
Balance ($)	140	160	180

NOT constant Ratio
⇒ Non-Proportional

$\frac{140}{1} = 140$ $\frac{160}{2} = 80$ $\frac{180}{3} = 60$