Math 7 Notes
Proportional and Nonproportional Relationships
(Section 1-4)

Two quantities are <u>proportional</u> if they have a <u>constant ratio</u> or <u>unit rate</u>.
If they do not have a constant ratio or unit rate, they are <u>nonproportional</u>.

How can we show that two objects are <u>proportional</u>?

Look at ratios
Are they the same?

Proportional or Not?

Mrs. Cochran is planning a year end pizza party for her students. Ace Pizza offers free delivery and charges $8 per medium pizza.

* Make a chart to show different possibilities
* Show the simplified ratios for each situation
* Decide if they are always the same or not

*step 1 2 3

Cost ($)	8	16	24	32			
Pizza (# of)	1	2	3	4			

$$\frac{cost}{pizza} \quad \frac{8}{1} \quad \frac{16}{2} \quad \frac{24}{3} \quad \frac{32}{4}$$

⑧ $\frac{8}{1}$ ⑧ ⑧
⑧

cost is proportional to the # of pizza

Proportional or Not?

Uptown Tickets 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?

* Make a chart to show different possibilities
* Show the simplified ratios for each situation
* Decide if they are always the same or not

$\frac{7}{3}$ $\frac{7}{3}$ $\frac{777}{3}$ $\frac{7777}{3}$

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

$$\frac{cost}{tickets} \quad \frac{10}{1} \quad \frac{17}{2} \quad \frac{24}{3} \quad \frac{31}{4}$$

$^\$10$ $^\$8.50$ $^\$8$ $^\$7.75$

Not constant ratio means not proportional

Proportional or Not?

Is the amount of sugar used proportional to the amount of mix used to make this fruit punch? Show proof.

Fruit Punch Recipe

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

$$\frac{sugar}{mix} \quad \frac{\frac{1}{2}}{1} \quad \left(\frac{\frac{1}{2}}{2}\right) \quad \frac{1\frac{1}{2}}{3} \quad \frac{2}{4}$$

$\left(\frac{1}{2}\right)$ $\frac{1.5}{3}$ $\left(\frac{1}{2}\right)$

.5
$\left(\frac{1}{2}\right)$

IS proportional Ratio of sugar to mix is always $\frac{1}{2}$

Proportional or Not ?

At the beginning of the year, Megan had $200 in the bank. Each week she deposits another $50. Is her bank account balance (proportional to) the number of weeks of deposits? Prove it.

Time (# of weeks)	0	1	2	3	4	5
Balance in account	200	250	300	350	400	450

$$\frac{\text{Balance in account}}{\text{\# of weeks}} \quad \frac{200}{0} \quad \frac{250}{1} \quad \frac{300}{2} \quad \frac{350}{3} \quad \frac{400}{4} \quad \frac{450}{5}$$

(250) (150) (116.67) (100) (90)

Not proportional

Which situation represents a proportional relationship between the time spent reading and the number of pages read? Explain.

Is the # of pages proportional to the time?

Pages Gabriel Read	3	4	7
Time (in minutes)	5	10	15

$$\frac{\text{pages}}{\text{time}} \quad \frac{3}{5} \quad \frac{4}{10} \quad \frac{7}{15}$$

(.6) (.4) (.46)

Not proportional

Pages Martin Read	2	4	6
Time (in minutes)	5	10	15

$$\frac{\text{pages}}{\text{time}} \quad \frac{2}{5} \quad \frac{4}{10} \quad \frac{6}{15}$$

.4   .4   .4

Is proportional

Determine if the length of an edge of a cube is (proportional) to its volume.

Remember
s = edge of cube
V = Volume
$V = s^3$

1·1·1   2·2·2   3·3·3

length	1	2	3			
Volume	1	8	27			

$$\frac{\text{length}}{\text{Volume}} \quad \frac{1}{1} \quad \frac{2}{8} \quad \frac{3}{27}$$

(1)   ¼   ⅑

(.25) (.T)

not proportional

Determine if the length of a side of a square is proportional to its perimeter.

☐ s

Remember
s = side of square
P = Perimeter
P = 4s

length	1	2	3	4	5	6
Perimeter	4	8	12	16	20	24

$$\frac{\text{length}}{\text{Perimeter}} \quad \left(\frac{1}{4}\right) \quad \frac{2}{8} \quad \frac{3}{12} \quad \frac{4}{16} \quad \frac{5}{20} \quad \frac{6}{24}$$

(¼) (¼) (¼) (¼) (¼)

Yes it is proportional.

Ratio always 1 to 4