Unit 5: Percent, Ratio, and Rate   Name: _____

5.9 Exploring Rates – Notes

Notes: When we compare two things with different units, we have a **rate.**
                  Here are some rates:

- We need 5 sandwiches for every 2 people.
- Oranges are on sale for $1.49 for 12
- Gina earns $4.75 per hour for baby-sitting (**unit rate**)
- There are 500 sheets on one roll of paper towel (**unit rate**)

A **unit rate** compares a quantity to 1 unit.
For example, Jamal skipped rope 80 times in 1 minute.
We write this as 80 skips/min (we say 80 skips per minute).

Example (1): A printing press prints 120 sheets in 3 minutes.
a) Express the printing as a unit rate.
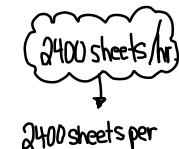
$$\text{Sheets : minutes}$$
$$120 : 3$$
$$x : 1$$

$$\frac{3x}{3} = \frac{120}{3}$$
$$x = 40$$

40 sheets/min

40 sheets per 1 minute

b) How many sheets are printed in 1 hour?

1 hour = 60 minutes

$$\text{Sheets : minutes}$$
$$120 : 3$$
$$x : 60$$

$$\frac{3x}{3} = \frac{7200}{3}$$
$$x = 2400$$

2400 sheets/hr

2400 sheets per 1 hour.

c) How long will it take to print 1000 sheets?

$$\text{Sheets : minutes}$$
$$120 : 3$$
$$1000 : x$$

$$\frac{120x}{120} = \frac{3000}{120}$$
$$x = 25$$

It will take 25 minutes to print 1000 sheets.

Example (2): a) A human walks at an average speed of 5 km/h.
What is this speed in metres per second?

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5 Km = 5000m

metres : seconds

5000 : 3600
    x : 1

1hr. = 60 min = 3600 sec
       x60   x60

$$\frac{3600x}{3600} = \frac{5000}{3600}$$ $x = 1.3\overline{8}$

Average human
walks about
1.4 m/second

b) A squirrel can run at a top speed of about 5 m/s.
What is this speed in kilometers per hour?

meters : seconds

x60   (5 : 1)
) x60
   300 : 60 .... 300m   in 60 secs (1min)
x60
) x60   18000 m in 3600 secs (1hr.)
   18000 : 3600 ....

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18000m = 18 km

Speed is 18 Km/hr