Grade 6 Ratios and Rates SOLUTIONS

1. In a class of 27 students, the ratio of girls to boys is 3:6. Which of the following statements are true? (Circle the statements you think are true)

    a. We know exactly how many are in the class *TRUE there are 27.*
    b. We can figure out how many boys there would be in a class of 36 students. *TRUE 3 boys + 6 girls =9 kids and 36÷9=4. This means we have 4 groups of 9 kids and in each group the ratio of 3:6 will hold:*

    

    *In each of the 4 groups there are 3 boys and thus there are 3x4=12 girls in total. In each of the 4 groups there are 6 girls and thus there are 4x6=24 girls in total.*
    c. We know exactly how many boys are in the class *TRUE. 3 boys + 6 girls =9 kids and 27÷9=3. This means we have 3 groups of 9 kids and in each group the ratio of 3:6 will hold:*

    

    *In each of the 3 groups there are 3 boys and thus there are 3x3=9 boys in total. In each of the 3 groups there are 6 girls and thus there are 3x6=18 girls in total.*
    d. If I randomly choose 9 students from the class. I can expect that 3 will be girls. *FALSE. We would probably expect to get 6 girls – the number of girls in each group of 9 shown above. However, many outcomes are possible.[1]*
    e. Half the class is female. *FALSE 2/3rds of the class is Female.*
    f. The ratio of boys to girls is 6:3. *FALSE it is 3:6 as we noted.*

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[1] In fact the exact probability of getting exactly 6 girls is only 819/49445 which is approximately 0.0166. However, if we repeated this experiment many many times then the average number of girls would be very close to 6.

2. If we paid $30 dollars for 6 hamburgers. What is the rate of hamburgers to price?

*30 dollars ÷6 hamburgers = 30/6 dollars per burger = $5 per burger.*



3. 15 pounds of gravel costs $150, but I only need 7 pounds. How much will it cost me? (adapted Lamon, 2012)

*$150÷15 pounds=150/15Dollars per pound of gravel=$10 per pound. So if we want 7 pounds this will cost us 7 pounds x $10 per pound=$70.*

4. Juanita participated in a walk-a-thon to raise money for her school. She recorded the total distance she walked at several different points in time, but a few of the entries got smudged and can no longer be read. The times and distances that can still be read are listed in the table below.
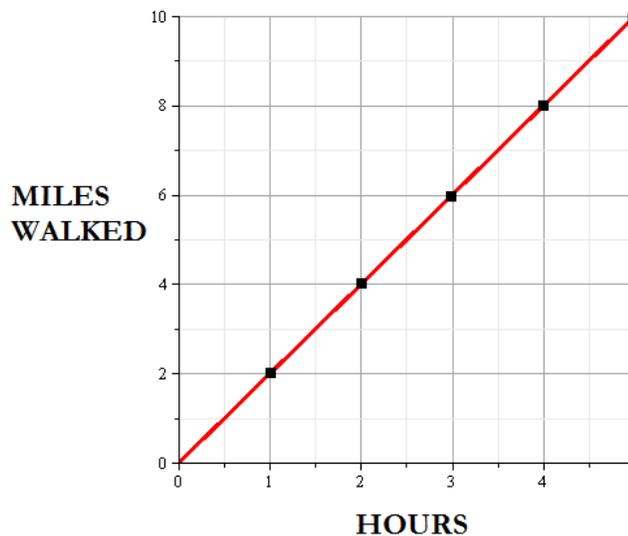
(a)

| Time in hours | Miles walked |
|---|---|
| 1 | |
| 2 | 4 |
| | 8 |
| 5 | |

| Time in hours | Miles walked |
|---|---|
| 1 | 1x2=2 |
| 2 | 4 |
| 8÷2=4 | 8 |
| 5 | 5x2=10 |

Assume Juanita walked at a constant speed. Complete the table and plot Juanita's progress in the coordinate plane.
*From the second entry we have 4 Miles÷2 hours=4/2 MPH=2 MPH.[2]*



MILES WALKED

HOURS

(b) How fast was Juanita walking in miles per hour? How long did it take Juanita to walk one mile? *She was going at 2 miles per hour.This is . $\frac{2}{1}x\frac{\frac{1}{2}}{\frac{1}{2}}$ =1 mile per half hours so it will  take 30 minutes to walk one mile.*

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5 .If it took 6 hours to mow 5 lawns, then at that rate, how many lawns could be mowed in 35 hours? At what rate were lawns being mowed?

*5 lawns÷6 hours =5/6 lawns per hour.*
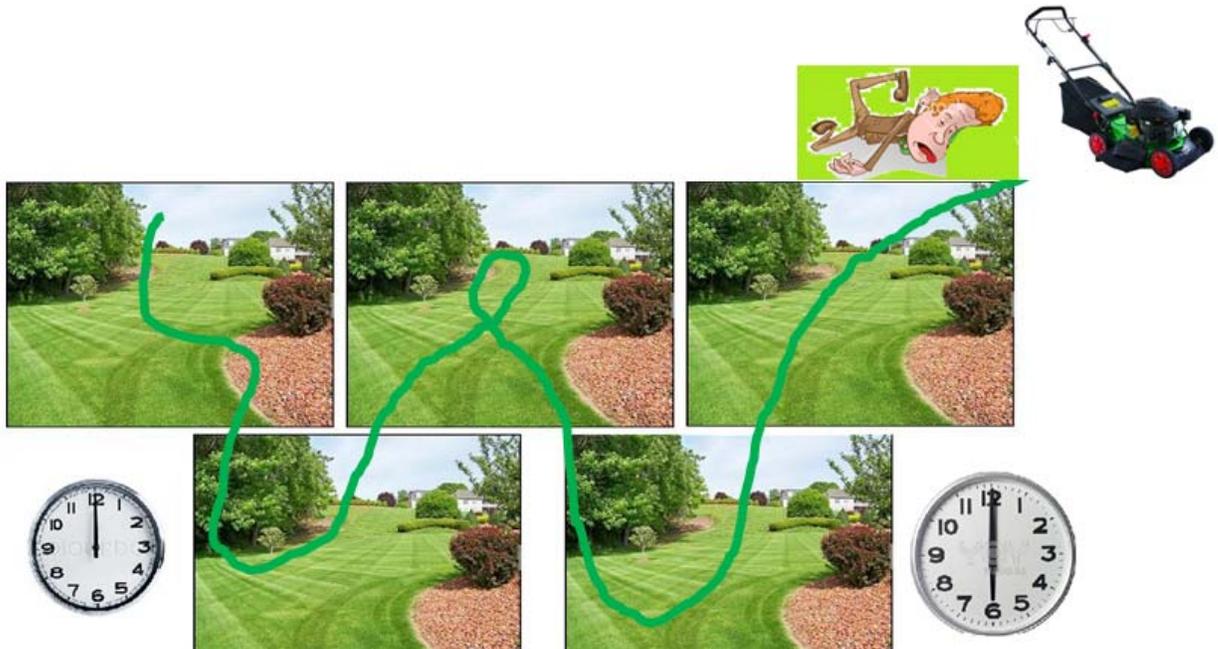


*Multiplying by 35 hours gives us*
      *35 hours x 6 lawns/5 hours=(35÷ 5) x6 lawns = 7x6 lawns = 42 lawns.*
*Our mower needs to get in shape!*

6. Zack and James live 45 miles apart. Sometimes on a Saturday, they ride their bikes toward each other's houses and meet somewhere in between. Zack is a very consistent rider - he finds that his speed is always very close to 10 miles per hour. James rides more slowly than Zack, but he is working out and so he is becoming a faster rider as the weeks go by.

(a) On a Saturday in July, the two friends set out on their bikes at 8 am. Zack rides at 10 miles per hour, and James rides at 5 miles per hour. After one hour, how far apart are they?



At 9am they are $45-5-10=30$ miles apart

5 miles — 10 miles — 45 miles
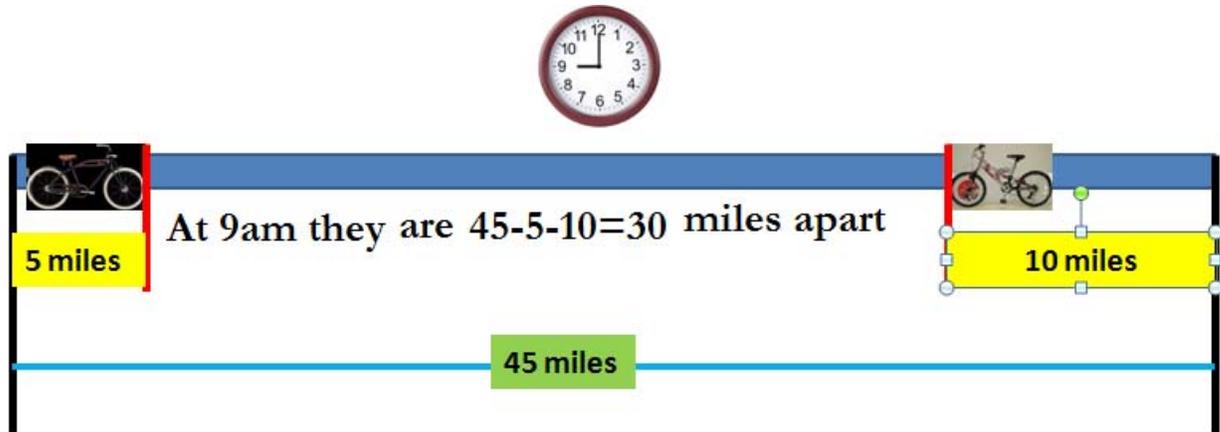
(b) Make a table showing how far apart the two friends are after zero hours, one hour, two hours, and three hours.



At 10 am they are $45-10-20=15$ miles apart

At 11 am they are $45-15-20=0$ miles apart
THEY MEET!

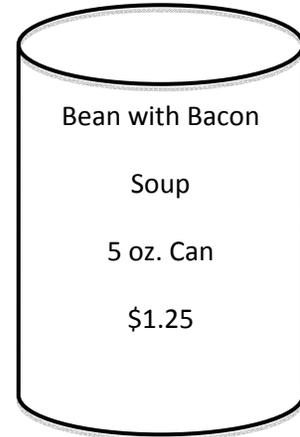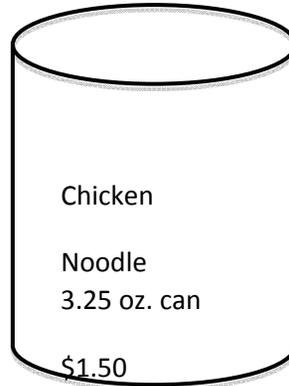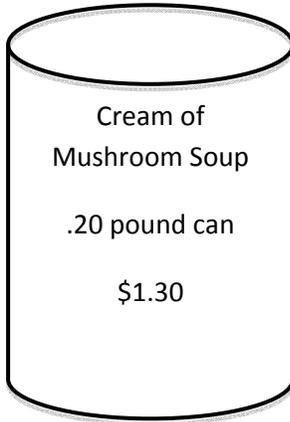| HOURS SINCE START | TIME OF DAY | MILES APART |
|---|---|---|
| 0 | 8 am | 45 |
| 1 | 9 am | 30 |
| 2 | 10 am | 15 |
| 3 | 11 am | 0 |

(c) At what time will the two friends meet? *11am*

17. Elaine bought a shirt on sale that was 25% less than the original price. The original price was
    $ 15 more than the sale price. What was the original price? Explain or show work.
    *The $15 discount is 25% or 1/4$^{th}$ of the original price. Thus the original price must be*
    *$15+$15+$15+$15=4x$15=$60.*

18. The following shows the prices of 3 types of soup:

Cream of Mushroom Soup
.20 pound can
$1.30

Chicken Noodle
3.25 oz. can
$1.50

Bean with Bacon Soup
5 oz. Can
$1.25

Calculate the unit rate in ounces for each soup.

Cream of Mushroom Soup $1.30 per 0.2 pounds=$1.3 \div 0.2 \frac{\$}{pound}$ =$6.50 per pound. Since 1 pound is 16 oz we have $6.50 per 16 oz=$6.5 \div 16 \frac{\$}{ounce}$ which is about $0.41 per ounce.

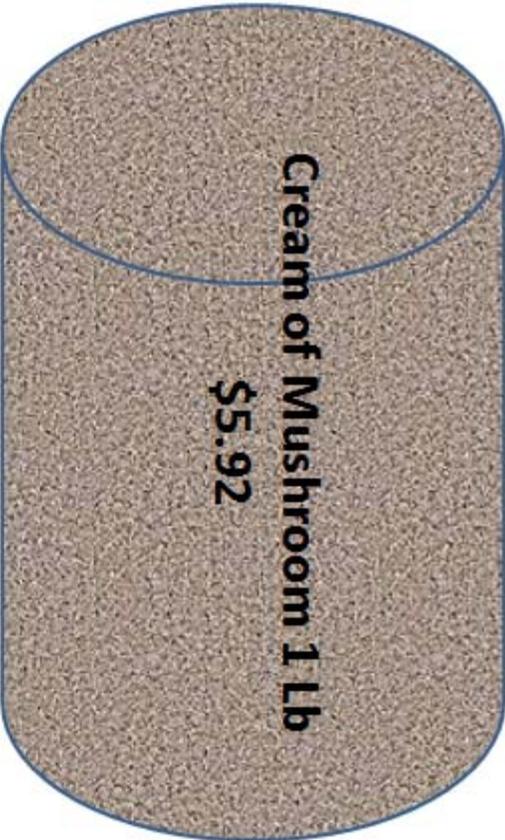Chicken Noodle $1.50 per 3.25 oz=$1.5 \div 3.25 \frac{\$}{ounce}$ is about 0.46$ per ounce.

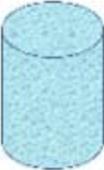Bean with Bacon Soup $1.25 per 5 oz=$1.25 \div 5 \frac{\$}{ounce}$ which is $0.25 per ounce.

In addition to the Cream of Mushroom soup can above, the store also sells a bigger, one-pound can of Cream of Mushroom for $5.92.

Which can of the Cream of Mushroom Soup is the better deal?  Show your work to justify your answer. *The large can sells for $5.92 per 16 oz=$5.92 \div 16 \frac{\$}{ounce}$=$0.37/ounce. THIS IS A BETTER DEAL!*

*To help your intuition here are the relative sizes of the cans:*

Cream of Mushroom
$1.30

Chicken Noodle
$1.50

Bean & Bacon
$1.25

Cream of Mushroom 1 Lb
$5.92