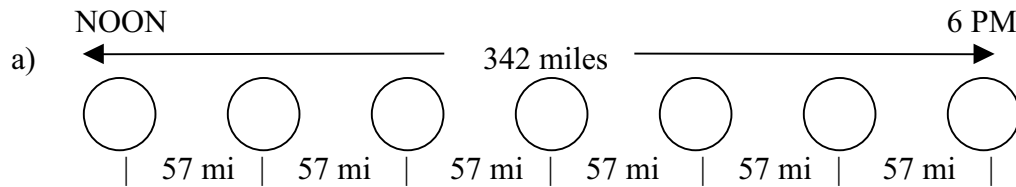


1.2 Rates and Ratios

1)



b)

$$\text{Rate} = \frac{\text{Distance}}{\text{Time}} = \frac{342 \text{ miles}}{6 \text{ hours}} = \frac{57 \text{ miles}}{1 \text{ hour}} = 57 \frac{\text{mi}}{\text{hr}}$$

3) Dividing a number by $\frac{1}{3}$ is the same as multiplying that number by 3. This can be seen from the figure since Sam will travel *3 times as far* in one hour as she would go in $\frac{1}{3}$ hr.

5)

a) Joe's apple picking rate = $\frac{250 \text{ apples}}{2 \text{ hrs}} = \frac{125 \text{ apples}}{1 \text{ hour}} = 125 \frac{\text{apples}}{\text{hr}}$

b) Rachel's house painting rate = $\frac{2 \text{ houses}}{9 \text{ days}} = \frac{2}{9} \frac{\text{house}}{\text{day}} \approx 0.222 \frac{\text{house}}{\text{day}}$

c) Randy's bike repair rate = $\frac{1 \text{ bike}}{3 \text{ hours}} = \frac{1}{3} \frac{\text{bike}}{\text{hour}} \approx 0.333 \frac{\text{bike}}{\text{hour}}$

7)

a) $75\% = \frac{75}{100} = \frac{3}{4}$

b) $40\% = \frac{40}{100} = \frac{2}{5}$

c) $70\% = \frac{70}{100} = \frac{7}{10}$

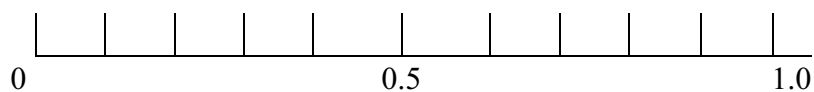
d) $33.3\% = \frac{33.3}{100} \approx \frac{1}{3}$

e) $62.5\% = \frac{62.5}{100} = \frac{5}{8}$

f) $66.7\% = \frac{66.7}{100} \approx \frac{2}{3}$

9) When you enter $1 \div 0$ on your calculator, you should get an error message. This happens because division by zero is undefined. To better understand this, ask yourself, "how many groups of zero are contained in a given number"? Because it is impossible to answer that question, there is no way to define division by zero.

11)



13)

- a) $.65 = \frac{65}{100} = \frac{5 \cdot 13}{5 \cdot 20} = \frac{13}{20}$
- b) $1.24 = \frac{124}{100} = \frac{4 \cdot 31}{4 \cdot 25} = \frac{31}{25}$
- c) $.575 = \frac{575}{1000} = \frac{25 \cdot 23}{25 \cdot 40} = \frac{23}{40}$
- d) $.400 = \frac{400}{1000} = \frac{200 \cdot 2}{200 \cdot 5} = \frac{2}{5}$
- e) $.804 = \frac{804}{1000} = \frac{4 \cdot 201}{4 \cdot 250} = \frac{201}{250}$

15) According to the CALCULATOR,

- a) $.3 = 3/10$
- b) $.33 = 33/100$
- c) $.333 = 333/1000$
 Notice that on a TI-83, there is a limit to how large a denominator the calculator will display. Therefore it cannot express the decimals in (d) and (e) as fractions.
- d) $.3333 = .3333$
- e) $.3333333333 = .3333333333$
- f) $.333333333333 = 1/3$ —CAUTION!!!—*This is not literally true!!!*
- g) The student is wrong. Here, the calculator only *approximates* the value of $.333333333333$ to $1/3$. Again, in actuality, $.333333333333 \approx 1/3$. It is not equal to $1/3$. There has to be an infinite (*not finite*) number of 3's after the decimal point in order for the decimal to be exactly equal to $1/3$. The main points of this exercise are to emphasize that (a) written parts of infinitely repeating decimals are only *approximations* of the fractions they are attempting to represent and (b) calculators don't always give the exact answers—lots of times they approximate!

Skill and Review

17)

- a) $54,000,000/60,000 = 5400/6 = 900$
- b) $700 \cdot 2000 \cdot 5000 = (7 \cdot 2 \cdot 5) \cdot (100 \cdot 1000 \cdot 1000) = 70 \cdot 100 \cdot 1000 \cdot 1000 = 7,000,000,000$ (7 billion)

19)

- a) $\frac{10 \text{ meters}}{1 \text{ second}} = 10 \frac{\text{m}}{\text{s}}$
- b) $\frac{1}{2} * (4 \text{ mi})$
- c) $68 + 6$
- d) $81 - 9$