Possible Activities for 1-1

Section 1-1-1 (Estimations)

1. If we add a number in the 100000’s to a number in the 100’s, in what number range should we expect the answer to be? Do the same, except we are multiplying the two numbers. (Symbol sense later: x^5 + x^2 vs. multiplying?
2. For each of the following, if the answer is “yes”, give a story problem for the situation. If it is “no”, explain why not: Is it possible to add two positive numbers and arrive at an answer that is less than both numbers? Is it possible to multiply two positive numbers and arrive at an answer that is less than both numbers?
3. Rufus and Dufus are studying for their chemistry exam. They are trying to memorize Avogadro’s Number (6.022 x 10^23). Rufus only remembers the “6.022” while Dufus only remembers the “10^23”. Who will do better on the exam? Adding/multiplying with scientific notation: 7.8x10^3 + 1.01x10^8. Then multiply the two.
4. OER: High School; Iowa State: Scientific Notation
5. Which of these stories model addition of, multiplication of, or division of these two fractions? Why do their answers (including units) make sense in the stories? You need not solve the problems.
6. It takes 53/78 of an hour to sing an opera. How many hours will it take to sing 23/113 of the same opera?
7. It takes 53/78 of a gallon of paint to paint a wall. How many walls of the same size can you paint with 23/113 gallon of paint?
8. After using 53/78 of a gallon of gas to mow the lawn, you had 23/113 gallon of gas left in the mower. How much of a gallon of gas did you start with in the mower?
9. In his journey today, Alvin the Ant traveled 53/78 of a yard. If Alvin travels at 23/113 yards per minute and took no breaks, how long (in minutes) was Alvin’s journey?
10. In his journey today, Alice the Ant traveled 53/78 of a yard. If Alice traveled for 23/113 minutes, how fast did Alice travel?
11. Ambrose the Ant has traveled 53/78 yard, which is 23/113 of his entire journey. How long is Ambrose’s entire journey?

Section 1-1-2 (Units)

1. If there are 2.54 cm in every inch, how many inches are in 50 cm? How many cm are in 50 inches?
2. If there are 2.54 cm in every inch, how many square inches are in 50 square cm? How many square cm are in 50 square inches?
3. If there are 2.54 cm in every inch, how many inches are in 50 square cm? How many cm are in 50 square inches?
4. Give 3 different units for area, at least one of which does not begin with “square”.
5. Which is faster: 50 mph or 75 feet per second?
6. If there are 7.48 gallons in one cubic foot, how many cubic centimeters are there in 500 gallons?
7. If Johnny earns $14 per hour working at Blue Castle and he clocks into work at noon having a net worth of $156 and, assuming he works with no breaks, how much will Johnny’s net worth be at 4PM? At xPM? Be sure to show the units of each quantity in your calculation to show that the unit of the answer is “dollars”. (i.e., why does “mx + b” work unit-wise?).
8. If Francine is working at Red Castle and has $33 at 6PM and $78 at 11PM, how much money has Francine earned from 6PM to 11PM (Show units in your calculation)? At what rate is Francine earning money each hour (show units in your calculation)? Be sure to justify the operations you use (meaning and units of slope).
9. 5/6 of County A is covered by blacktop. 2/3 of County B is covered by blacktop. County A and County B are the same shape and size. Argue in two ways why the fraction of the combined counties A and B that is covered by blacktop is NOT 5/6 + 2/3.
10. Lyla likes to run from her house to the park and back again along the same path every day (Could also use different explicit and implicit distances). If she runs at 2 mph from home to the park and 4 mph from the park to home, what is her average speed for the entire trip? If she runs at 3 mph from home to the park, how fast should she run from the park to home if she wants to average 4 mph for the whole trip? If she runs at 3 mph from home to the park, how fast should she run from the park to home if she wants to average 6 mph for the whole trip?
11. Penny has an exercise routine. She likes to jog fast at x miles per hour for t hours and jog slow at y miles per hour for s hours. What is her average speed for her routine? (could do with numbers, then variables for the quantities).
12. Assume velocity is given in feet per second (How many feet are gained or lost each second = change of position divided by change in time). What should be the unit of acceleration (change of velocity over change in time)? Why does this unit make sense?
13. If the formula at^2 + bt + c gives the height of a ball (in feet) t seconds after being tossed up in the air, what must be the units of the numbers a, b, and c?
14. Sammy can’t remember which of the two formulas: 2πr or πr^2 gives the area of a circle. Assuming that 2 and π do not have units and r is the radius of a circle, which formula could NOT be the area of a circle? Which has a chance to be the area of a circle (and why might it not be)?
15. An angle measured in radians is defined to be the distance traveled around a circle from the initial to terminal side of the angle divided by the radius of the circle. What are the units for a radian?

Section 1-1-3 (Percents)

1. Answer the following for population in 2021 of 100 people. Then answer for a 2021 population of 384569. Then answer for a 2021 population of x people:

If the population of a town goes down by 13.2% in the next year, what percentage of 2021’s population is 2022’s population? If the population continues to decrease by 13.2% each year, what percentage of 2021’s population will 2023’s population be? If the population has been decreasing by 13.2% for quite some time, what percentage of 2021’s population was 2020’s population?

Replace “decrease” with “increase”

1. Answer the following for population in 2021 of 100 people. Then answer for a 2021 population of 384569. Then answer for a 2021 population of x people.

If the population of a town goes up by 13.2% in the next year, what percentage of 2021’s population is 2022’s population? If the population continues to grow by 13.2% each year, what percentage of 2021’s population will 2023’s population be? If the population has been increasing by 13.2% for quite some time, what percentage of 2021’s population was 2020’s population?

1. If Minnie raises prices of a bow by 23% this week and then lowers the prices of the same bow by 23% next week, argue why the price of the bow after the 23% decrease will be lower than the price of the bow before the 23% increase. What percentage of the original price will the final price be? Do the same, except Minnie lowers the price and then raises the price.
2. Difference between a $5 vs. a 5% increase.
3. ORCCA: P. 85-89: Many different standard % problems.