Defining Quantities for Modeling Worksheet

Algebra 1 · Common Core HSN-Q.A.2

> Define appropriate quantities for the purpose of descriptive modeling.

Practice

Builds the skill step by step.

1. To model the cost of a taxi ride, which quantity is most useful?
   A. the day of the week
   B. the color of the taxi
   C. the distance in miles
   D. the driver's age

2. To describe how fast a plant grows, which quantity fits best?
   A. change in height per week
   B. the plant's color
   C. the pot's weight
   D. the number of leaves

3. Let h be the number of hours worked at 15 dollars per hour. Which expression gives the pay in dollars?
   A. $15 \div h$
   B. $h - 15$
   C. $h + 15$
   D. $15h$

4. To compare the fuel efficiency of two cars, which quantity is best?
   A. the car's price
   B. miles per gallon
   C. total miles driven
   D. the gas tank's size

5. To describe how crowded a school's classes are, which quantity is best?
   A. number of teachers
   B. students per classroom
   C. number of desks
   D. total students

6. To compare food prices at two stores, which quantity is best?
   A. number of items
   B. total bill
   C. store size
   D. price per ounce

7. To describe how fast a city is growing, which quantity fits best?
   A. number of roads
   B. land area
   C. people per year
   D. total population

8. Two runners ran different distances. Which quantity compares their speed fairly?
   A. average speed (distance per time)
   B. total distance
   C. total time
   D. number of laps

9. To describe a household's water use, which quantity fits best?
   A. size of the house
   B. total gallons ever used
   C. gallons per day
   D. number of faucets

10. To compare phone plans, which quantity is most useful?
   A. dollars per month
   B. number of phones
   C. total minutes ever
   D. the phone's color

ALBERT

Name _____ Date _____

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On Level

Grade-level practice.

1. State A has more car crashes than State B but a much larger population. Which quantity compares their safety fairly?

   A. land area

   B. crashes per 100,000 people

   C. total crashes

   D. number of roads

2. Website A is 10 years old and website B is 1 year old. Which quantity compares their popularity fairly?

   A. age of the site

   B. number of pages

   C. total visits ever

   D. visits per day

3. Define quantities you would use to model the profit of a lemonade stand.

4. Why is comparing total crimes in a big city and a small town misleading?

   A. It isn't misleading.

   B. The populations are very different, so a rate per person is fairer.

   C. Small towns have no crime.

   D. Big cities don't count crimes.

5. A team scores 84 points in 3 games. How many points per game is that?

6. To model how crowded a park is, which quantity is best?

   A. total visitors per year

   B. number of trees

   C. acres of the park

   D. people per acre

7. Car A goes 300 miles on 10 gallons. Car B goes 360 miles on 12 gallons. What is the difference in their miles per gallon?

8. Which quantity describes how steep a ramp is?

   A. the ramp's weight

   B. ramp length

   C. rise per unit of run

   D. ramp color

9. Which variable definition is clearest?

   A. Let n = the number of tickets sold.

   B. Let n = tickets.

   C. Let n = stuff.

   D. Let n.

10. Store A sells 2 pounds for 5 dollars. Store B sells 3 pounds for 7.20 dollars. What is the lower price per pound, in dollars?

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Challenge

Multi-step and word problems that stretch it.

1. To model a student's screen time, which quantity is best?
   A. screen size
   B. total hours since birth
   C. hours per day
   D. number of devices

2. Explain why batting average (hits per at-bat) is a better quantity than total hits for comparing two baseball players.

3. A region has 3,000 doctors for 1,500,000 people. How many doctors is that per 10,000 people?

4. Which quantities should a model of shipping cost include?
   A. the package's weight and the distance
   B. the box's color
   C. the sender's name
   D. the day of the week only

5. A hiker burns 1,200 calories in 2 hours. How many calories per minute is that?

6. Which quantity best compares the energy use of two refrigerators?

   A. the number of shelves

   B. the price

   C. the fridge's height

   D. kilowatt-hours per year

7. A 12-inch pizza (area about 113 square inches) costs 12 dollars. A 16-inch pizza (about 201 square inches) costs 18 dollars. Which is the better buy per square inch?

   A. the 16-inch pizza

   B. the 12-inch pizza

   C. They cost the same per square inch.

   D. You can't tell.

8. Two classes have different numbers of students. Which quantity compares their test performance best?

   A. the mean score

   B. the total of all scores

   C. the highest score only

   D. the number of students

9. Plan A costs 0.10 dollars per minute. Plan B costs a flat 20 dollars. At how many minutes do they cost the same?

10. A student writes "Let c be the cost." What would make this definition clearer?

    A. Use a capital C.

    B. Nothing.

    C. Say what the cost is for and its unit, like dollars per month.

    D. Use a different letter.