

Chapter 1 Study Guide

Name: _____
 Class: _____
 Date: _____

1. Fill in the blank with either $<$, $>$, or $=$.

a. 91.01 $<$ 91.10

b. 5.163 $>$ 5.0163

c. 1.345 $>$ 0.678

d. 398.34 $=$ 398.34000

e. Round both numbers in problem b above to the nearest tenths position:

$5.163 \rightarrow 5.2$ $5.0163 \rightarrow 5.0$

f. Round the first number in problem d above to the:

ones position, $398.34 \rightarrow 398$ tens position, $398.34 \rightarrow 400$ (no decimal point)

2. Consider the list of numbers below.

0.34 0.4 0.034 0.304 0.314

a. Which number is the smallest? Explain in a sentence how you know. Use mathematical language.

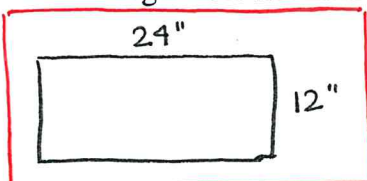
0.034 is the smallest. I know this because 0.034 has no ones and no tenths and every other number in the group has no ones but a digit greater than zero in the tenths place.

b. Which number is the greatest? Explain in a sentence how you know. Use mathematical language.

0.4 is greatest. I know this because 0.4 has four tenths and every other number in the group has either three tenths or zero tenths. No number has any ones.

3. The perimeter of a rectangle is 72 inches. The length of the rectangle's base is twice the length of its height.

a. Is there only one rectangle that fits these conditions? If so, draw and label it. If there is not a second or third rectangle fitting these conditions, explain why not in a sentence using mathematical reasoning and language. Remember, rotating or reflecting a rectangle does not make a new rectangle.



$2(12) + 2(24) = 72$ so this rectangle fits the condition. You can get the perimeter by multiplying the shorter side ($12''$) by 6. No number except 12 times 6 equals 72 so there are no other rectangles that fit the criteria.

4. To pass the time while driving to the beach (an 11 hour trip for them!), Davis and Tess play a "Guess my number" game. Davis gives Tess the following 10 clues:

My number is:

- A three-digit whole number
- Divisible by 5
- Even
- Each digit is different
- Its tens digit is greater than its one digit
- Its hundreds digit is greater than its tens digit
- Less than 400
- Divisible by 3
- Has only one odd digit
- Its tens digit is 1

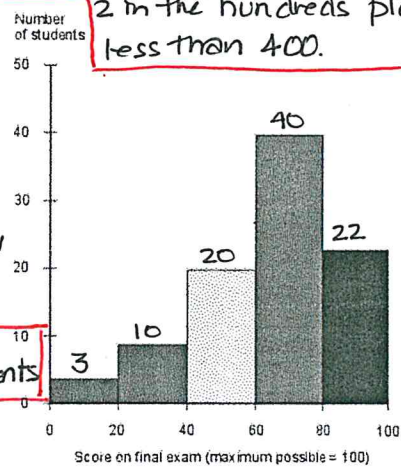
Tess figures it out, can you? Explain how you know your number is divisible by 3 and 5. Be complete and clear!

Dave's number: 210

Explain how you found your answer in complete sentences:

210 must be Dave's number because 1) it has 3 digits; 2) it ends in zero so it is both even and divisible by 5; 3) the sum of its digits is 3 so it is divisible by 3; 4) the two in the hundreds place is greater than the one in the tens place and the one is greater than the zero in the ones place; 5) one is the only odd digit; 6) And it has a 2 in the hundreds place so it is less than 400.

5. Ms. Peets presented the histogram at right to her class. It showed the results of her final exam.



a) Give your best estimate of how many students Ms. Peets has in her classes. Explain in a sentence how you got your answer.

I got the sum of the number of students represented in each bin. I could estimate how tall each bin is by reading its height on the vertical axis.

$3 + 10 + 20 + 40 + 22 = \text{Approximately } 95 \text{ students}$

b) The largest group of students' scores fell into what range of scores? Give as precise and narrow a range as possible from reading the graph. Explain in a sentence how you got your answer.

The largest group was in the 60-79 pt. bin. That is the tallest bin and it represented approximately 40 students.

c) Are there any students who did not pass? Failing is a score below 60. If so, approximately how many?

Yes, there are approximately 33 students who did not pass. The three bins to the left of the 60 on the horizontal axis represent the failing students and

d) Did any student get a perfect score? Write a clear sentence explaining your reasoning. $3 + 10 + 20 = 33$

There are 22 students who had scores from 80-99, but no score was 100 or there would need to be a bin for the 100-119 group.

6. To earn a little money, John made birdhouses. The first week he was just learning and only made two birdhouses. The next week, he made twice as many birdhouses as the first week. By the third week, he made twice as many as the second week and the same pattern continued.

a. Organize this information into the table below and extend the pattern to the sixth week.

Week Number	1	2	3	4	5	6
Number of Birdhouses Built that Week	2	4	8	16	32	64

b. If John was able to continue making birdhouses according to this pattern for 8 weeks, how many birdhouses would he make during the eighth week? How did you find your answer? Write a clear sentence with mathematical reasoning to explain.

If John continued the pattern he would double the number of birdhouses from each week to the next so he would make $2(64)$ or 128 in week #7 and $2(128)$ or 256 birdhouses in Week #8.

c. Do you think John could realistically continue using this pattern to make birdhouse on his own for a year? Why or why not? Explain in a sentence and use mathematical reasoning and examples.

No, the pattern could not be sustained for a year. There are 52 weeks in a year and the pattern can be written as 2 to the power of the week number because $2^1 = 2$, $2^2 = 4$, $2^3 = 8$, etc. so for the 52nd week it would be approximately 4,500,000,000,000,000 bird houses.

7. Find the prime factorization for the numbers below.

$$1400 = 2^3 \cdot 5^2 \cdot 7$$

Diagram showing the prime factorization of 1400:

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      1400
       ^
      10  140
     ^  ^
    (2) (5) 14  10
           ^  ^
          (2) (7) (2) (5)
  
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$$243 = 3^5$$

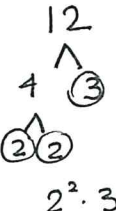

Diagram showing the prime factorization of 243:

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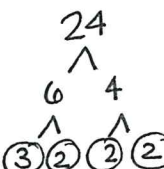
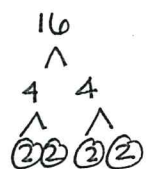
      243
       ^
      (3) 81
           ^
          9  9
           ^  ^
          (3) (3) (3) (3)
  
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8. Show your work and use either a table or prime factorization to find the following:

$LCM(12, 9) = \boxed{36}$
 $LCM = 2^2 \cdot 3^2 = 36$

$LCM(24, 16) = \boxed{48}$
 $LCM = 2^4 \cdot 3 = 48$

9. What number is being described in these puzzles?

a. When I divide my number by 8, I get 7

Number: $\boxed{56}$ $\frac{56}{7} = 8$

b. When I subtract 43 from my number, I get 19

Number: $\boxed{62}$ $19 + 43 = 62$

c. When I round this decimal number, it is 14
The sum of its digits is 10.
The product of its digits is 18.

Number: $\boxed{13.6}$ $\overset{\sim}{13.6} = 14$
 $1 + 3 + 6 = 10$
 $1 \cdot 3 \cdot 6 = 18$

d. When I round this decimal number, it is 4.1
The product of its digits is 8.
The hundredth digit is double the tenth digit.

Number: $\boxed{4.12}$ $4.\overset{\sim}{1}2 = 4.1$
 $4 \cdot 1 \cdot 2 = 8$
 $2(1) = 2$