Practice Problems for Reading About Math

Chapter 1: Numbering Systems and Sets

1. We have two sets. One is a list of people who are friends with Katie: {Ellen, Maria, George, Dylan, and Leah}. The second is a list of people who are friends with Sam: {Maria, Rose, Dylan, Eddie}. Katie and Sam are going to have a party. They want to invite all the people who are friends with either Katie OR Sam. How many people will they have to invite? Is this the *union* or the *intersection* of the two sets?

2. Suppose that instead Katie and Sam wanted to have a smaller play date, this time inviting just the people who are friends with both Katie AND Sam. How many would they invite in this case? Is this the *union* or the *intersection* of the two sets?

3. Set A is {0, 2, 8, 10}. Set B is {8, 10, 16, 20}. What is A intersect B?

4. Set A is {0, 2, 8, 10, 32}. Set B is {8, 10, 16, 20}. What is A union B?

5. Set C is {9, 3, 6, 2, 8, 1}. Which of the following is a subset of C?

     a. {9, 3, 6, 7}   c. {18, 6, 12, 4, 16, 2}

     b. {0, 1, 2}   d. {3, 6, 8}

6. What number is equal to seven hundreds, four tens, and zero ones?

7. What is the number 1,308 in expanded form?

8. In the number 203,534,192 what digit is in the thousands' place? What digit is in the millions' place? The tens' place?

9. How would you read the number 35,909,127?

10. Katie is 4 feet, 9 inches tall. Sam is the same height as Katie. If Eddie is the same height as Sam, how tall is Eddie?

11. True or False: 17 > 8.

12. Katie is still 4 feet, 9 inches tall. George is taller than Katie. Leah is taller than George. Is Leah's height greater than, less than, or equal to 4 feet, 9 inches?

13. Beagles are a subset of dogs, and dogs are a subset of animals. Are beagles also a subset of animals?

14. Set A is a subset of Set B. Set B is a subset of Set C. Is Set A also a subset of Set C?

15. Can you make up an example to illustrate that the relation, "Is not equal to," is not transitive?

Chapter 2: Addition

16. We use addition in situations where
A. One number increases another, or
B. One number decreases another?

17. When we add two numbers to get a third, what do we call the two numbers that are added?

18. When we add two numbers to get a third, what do we call the answer that we get?

19. 217+314 gives the same answer as 314+217. This is an example of the _____ law of addition.

20. 41+86 = 86 + what?

21. 4 + (2+3) tells us to:

A. first add 2 and 3 and then add 4 to what we get, or
B. first add 4 and 2, and then add 3 to what we get?

22. 4 + (2+3) gives the same answer as (4+2)+3. This is an example of the _____ law of addition.

23. The commutative law and the associative law of addition are referred to as "order doesn't make a difference" and "grouping doesn't make a difference." Which one of these is the commutative law?

24. Someone is working a math problem. The problem says that Jack worked 8 hours one day and 60 minutes the second day, and asks how long Jack worked altogether. Someone adds 8 and 60 and gets 68 as the answer. If the person made a mistake, what did the person do wrong?

25. Someone has learned to find the perimeter of a triangle (with 3 straight lines as sides) and a square and a rectangle (with 4 sides), but they haven't studied exactly how to find the perimeter of a pentagon, a figure with 5 sides. They come to a problem where they are given the lengths of the five sides and asked to find the perimeter. Can you explain to them what to do, and how they can find the perimeter of a figure with any number of sides?

26. Please say the answers to the following addition facts. Can you say them quickly?

6+7
8+9
7+8
7+5
4+9

6+5
8+5
6+8
9+6
7+9
9+5

27. Someone is 10 years old. How old will she be in 9 years?

28. What is the perimeter of a 4-sided figure with sides of length 3, 4, 5, and 6?

Chapter 3: Subtraction

29. 9-7 = 2. Which of those numbers is the minuend, which is the subtrahend, and which is the difference?

30. One person says, "When I subtract 9 - 7, I start with 9, and go backwards for 7 jumps. The answer is the number I land on.
The second person says, "When I subtract 9-7, I start with 7, and count the number of jumps it takes to get to 9. The number of jumps is the answer."

Which of these is right, or are they both right?

31. We have 12 cupcakes, but we give 4 away. How many do we have left?

_____
0 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25
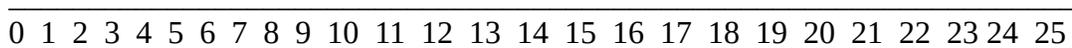
32. Use the number line above to show: what is 9 + 4.

33. Now use the number line to show: what is 14 - 3.

34. Fill in the blanks in this fact family:

      4 + 2 = ___
      2 + ___ = 6
      6 - 4 = ___
      6 - ___ = 4

35.
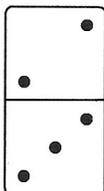
The first math fact in this domino's fact family is 2 + 3 = 5. What are the three others?

36. For the following addition problems, please say the four facts in the fact family.

3+4
7+9
8+6
7+6
8+3

Chapter 4: Regrouping in Addition and Subtraction

37. When you add 13+11, do you need regrouping, or can you just add the ones, and add the tens, and say the number that results?

38. When you add 15 + 16, if you just add the ones and tens separately, you get 2 tens and 11 ones. You do need to regroup this time, because you got a number of ones that is greater than what number? (Hint: the number I'm thinking of is not 10, but the lowest number that makes this rule true.)

39. Write a two digit number that is equal to 4 tens and 14 ones.

40. What standard number represents 6 tens and 23 ones?

41. When we are adding, and we combine some digits to get a two digit number -- for example, when we are adding 39 plus 26 and we combine the 9 and 6 to get 15, then we should

A. write down the number in the 1s place (5) and "carry" the number in the 10s place (1) over to the next column, (that is, write down the 5 and "carry" the 1),
or
B. write down the number in the 10s place (1) and "carry" the number in the 1s place (5) over to the next column, (that is, write down the 1 and "carry" the 5)?

42. 315+109 =

43. When we subtract 9 from 27, why do we need to regroup first? Because what number is greater than what number?

44. 2 tens and 7 ones = 1 ten and how many ones?

45. 54= 4 tens and how many ones?

46. When you subtract 33-14, you start out by regrouping so that your rename 3 tens and 3 ones as 2 tens and _____ ones?

47. When you add the numbers 1200 + 80 + 3, and you line them up in a column, do you line them up so that their rightmost digits are lined up underneath one another, or their leftmost digits are underneath one another? In other words,

```
1200
  80
   3
```

or
```
1200
80
3              ?
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Can you explain your answer?

48. 60-26 =

49. 304-172 =

50. 1000 - 414 - 12 =

Chapter 5: Word Problems, Part 1. Addition and Subtraction.

51. Here are 4 subtraction problems. Please say whether the problem is taking away, difference, missing addend, or movement on a number line.

a. The first person is 64 inches tall, and the second is 60 inches tall. How much taller is the first?
b. Someone has 14 dollars, and spends 6 dollars. How many dollars are left?
c. Someone is 10 miles from home, and they go 3 miles straight toward home. How many miles away are they?
d. Someone wants to work 8 hours today, and the person has worked 6 hours. How many more do they need to go till they get to their goal?

52. A boy has 7 books, and he buys 5 more. How many does he have now?

53. A girl has $20, but she spends $6 on lunch. How much money does she have left?

54. Leah has $9 more than Eddie has. Then she earns another $5 while Eddie sleeps in one morning. Leah now has how many more dollars than Eddie?

55. George also has $9 more than Eddie has. But by now Eddie has stopped sleeping so long, and one day Eddie earns $10 while George is still asleep. Who has more money now? How much more?

56. Dylan has $10. Then he takes care of his neighbor's dog for the day; after this, he has $22. How much did his neighbor pay him?

57. Suppose the temperature starts out at 45 degrees. Then it gets 13 degrees colder. What's the temperature now?

58. A family is returning from vacation. They are 52 miles from home. Then they get 7 miles closer to home. How far from home are they now?

59. Someone bought one thing for $3 and another for $4. If you want to find out much change the person gets from a $10 bill, what's the "intermediate question" to answer first? Is it

A. How much did the person spend in all?
or
B. How much more did the second thing cost than the first?

60. Someone bought one thing for $3 and another for $4. How much change should the person receive from a $10 bill?

61. Katie is 14 years old. She is 3 years older than Sam was 6 years ago. If you want to figure out how old Sam is, what's the "intermediate question" to answer first? Is it

A. What year was Katie born in?
or
B. How old was Sam 6 years ago?

62. Katie is 14 years old. She is 3 years older than Sam was 6 years ago. How old is Sam?

63. Without realizing it, a man walks around with a big hole in his wallet. One the first day, he loses 67 cents. On the second day, he loses 48 cents. If he started out with 200 cents, how many does he have left?

Chapter 6: Multiplication

64. Suppose that you have 3 packages of light bulbs, and there are 6 light bulbs in each package. How many light bulbs do you have total?

65. There are 5 rows of things, with 3 in each row. How many things are there in all?

66. There are 3 columns of things, with 5 in each column. How many things are there in all?

67. Are the previous two questions asking the same question about the same situation? Can you explain your answer to this?

68. If we skip count by 5s we get the following numbers. Fill in the blanks:

5   10   ___   20   ___   ___   35   ___   ___   ___   55

69. 5 x 4 =

70. Is 3 x 3 a perfect square? Is 3 x 2?

71. The commutative law of multiplication says that 7 x 9 is the same as ___ x ___.

72. 10 x 10 x 10 x 10 x 10 =

73. 34 x 1,000 =

74 . What are the first five multiples of 4? (4, ___, ___, ___, and ___)

75. Is 6 a factor of 24?

76. Is 24 a multiple of 6?

77. Is 7 a factor of 44?

78. Is 44 a multiple of 7?

79. Is 13 a prime number or a composite number? How about 14?

80. True or false: (2 x 8) x 3 = 2 x (8 x 3)

81. What is the area of a rectangle of length 20 meters and width 10 meters?

82. 3 x (2 + 1) =

83. Fill in the blanks: 4 x (8 + 10) = 4 x ___ + 4 x ___

84. Someone buys 3 books. Each book costs $9. How much does the person spend in all?

85 . Sam drives at 20 miles an hour. He drives for 2 hours. How far does he go?

86. 15 x 3 =

87. 23 x 40 =

88. 62 x 18 =

89. 123 x 111 =

Chapter 7: Telling Time with Analog Clocks and Watches

90. What time is it on this clock?

91. How about this clock?

92. How about this one?
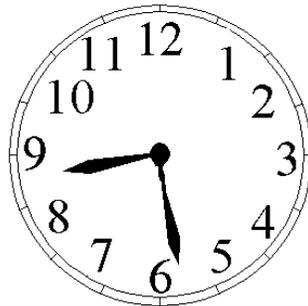
93. On an analogue clock, the little hand is between the 2 and the 3, and the big hand is on the 4. What time is it?

94. Someone says, "I know two rules for telling time with an analogue clock. 1. If the big hand is on the 12, you just look at what number the little hand is on, and it's that o'clock. 2. If the big hand isn't on the 12, and instead it's on one of the other 11 numbers: Whatever two numbers the little hand is between, the hour is the smaller of the numbers. Whatever number the big hand is on, you multiply that

number by 5, and that's the number of minutes."

Is this person right?

95. Someone else says, "And if the big hand is between two numbers, you just pretend that it's on the smaller number, and do what you said. Then you divide the space in between the numbers into 5 equal jumps, and you add one minute for each jump the big hand has made toward the next number."

Is this person right?

96. On an analogue clock, the little hand is between the the 9 and the 10. The big hand is between the 6 and the 7. It is 3/5 of the way to the 7. What time is it?

Chapter 8: Division

97. We have 9 turnips. We have bags that will hold only 3 turnips each. How many of these bags will we need to use?

98 . We want to divide 20 almonds among 5 friends. How many almonds will each friend get?

99 . Fill in the blanks in the following fact family:

    7 x 3 = ___
    ___ x 7 = 21
    21 ÷ 7 = ___
    ___ ÷ ___ = 7

100. What are the three "relatives" of the fact 5 x 6 = 30?

101. If we have 11 people, and we are dividing them into groups of 4, we make 2 groups and we have 3 people left over. A way of expressing this with division is:

A. 11 divided by 4 = 2 remainder 3
or
B. 11 divided by 4 = 3 remainder 2?

102. Suppose that 13 divided by 4 is 3 with remainder 1. Using the words dividend, remainder, divisor, and quotient, what do we call

a. the 13?
b. the 4?
c. the 3?
d. the 1?

103. We have 23 turnips. We also have those same bags that hold 3 turnips each. How many bags will we need to use this time if we have to pack up all of the turnips?

If there is no answer to one or both of the following questions, the answer is "There is no answer!"

104 . What is 8 ÷ 0?

105. What is 0 ÷ 8?

106 . 36 ÷ 2

107 . 864 ÷ 24

108. 14 ÷ 3

109. 918 ÷ 9

110. Someone divides 47 by 9 and gets 5 with remainder 2. If the person wants to check this, they should

A. multiply 5 x 9 and then add 2 to what they get.
or
B. multiply 5 x 2 and then add 9 to what they get.

Chapter 9: Order of Operations

111. When you're trying to decide whether to add or subtract first, do you

A. add first, because a comes before s in "Please excuse my dear aunt Sally,"
or
B. go from left to right, because addition and subtraction are tied in the priority list?

112. When you're trying to decide whether to multiply or divide first, do you

A. multiply first, because m comes before d in "Please excuse my dear aunt Sally,"
or
B. go from left to right, because multiplication and division are tied in the priority list?

113. 3 x 4 + 5 =

114. 2 + 8 ÷ 2 =

115. 3 x (4+5) =

116. 7 - 2 + 3 =

117 . 30 ÷ 3 x 5 =

118. 3 x 2 x 4 x 5 =

Chapter 10: Even and Odd Numbers

119. Is 18 odd or even? How about 27?

120. Please fill in the blanks: Even numbers end in _2__, _4__, ___, ___, or ___.

121. Please fill in the blanks: Odd numbers end in _1__, _3__, ___, ___, or ___.

122. A teacher has a classroom where there are two teams, team A and team B. The teacher is doing an exercise where the students divide up into pairs. The students tend to pick others to pair with who are on the same team. For team A, everybody has one partner, with no one left without a partner. For team B, the same thing is true. The teacher notices, "For our whole class, no one is left without a partner."

This illustrates that an even number plus another even number gives you what?

123. On another day, where some students are absent, the teacher does the same sort of pairing. Now team A pairs up with one person left without a partner. And team B also pairs up with one person left without a partner. But the two people who don't have a partner just partner with each other. The teacher notices, "For our whole class, no one is left without a partner."

This illustrates that an odd number plus another odd number gives you what?

124. On another day, where different numbers of students are absent, the teacher does the same sort of pairing. Now team A pairs up with no one left without a partner. Team B pairs up with one person left without a partner. The teacher notices, "For our whole class, there is one person left without a partner." (And the teacher lets one of the groups have 3 people.)

This illustrates that an even number plus an odd number gives you what?

125. Someone says, "If someone asks you whether you get an even or odd number when you add, subtract, or multiply two numbers, all you have to do is pick an example, and the rule will hold for other examples. For example, if someone asks whether an even times an odd is odd or even, I multiply 6 x 3, see that the answer 18 is even, and my answer is "even."

Is this person right or wrong?

126. Someone else replies to that person, "You left out division when you said that, and you were smart to do that. Suppose someone asks whether an even number divided by an even number is. 12 divided by 4 is odd. But 16 divided by 4 is even. So for division of even by even, it sometimes comes out one way and sometimes another."

Is this person right or wrong?

127. An even number minus an even number equals an even number or an odd number?

128. An odd number minus an odd number equals an even number or an odd number?

129. An odd number minus an even number equals an even number or an odd number?

130. An even number times an even number equals a number that is odd or even?

131. An odd number times an odd number equals a number that is odd or even?

132. An odd number times an even number equals a number that is odd or even?

133. Someone multiplies 126 x 427 and gets 53,801, Without doing any multiplying, can you say whether the person made a mistake?

134. Someone adds 468 and 526 and gets 984. True or false: The odd and even rules don't tell us that the person made a mistake, but the person still may have made a mistake.

Chapter 11: Literal numbers, or Variables

135. The number called pi is equal to a little over 3.1415. Is pi a variable, or a constant?

136. Someone sees in a mathematical expression, 6X, where X is a literal number. The expression 6X means what: the sum, the product, the difference, or the quotient of 6 and X?

137. Let's let J and K be two variables. Please use those variables to write or state the commutative law of addition, which says that "order doesn't make a difference" when you are adding.

138. Let's let P and Q be two literal numbers. Please use those to state the commutative law of multiplication, which says that "order doesn't make a difference" when you are multiplying.

139. Let's let A stand for the area of any rectangle, L stand for its length, and W stand for its width. Please use those literal numbers to state the formula for the area of a rectangle, which is that the area is equal to the length times the width.

140. Someone is adding 5+3+4. They notice that if they start with 5+3 and get 8, and then add 4, they get 12. If they ad 3+4 first, and get 7, and then add the 5 to that, they also get 12. This is an example of the "grouping doesn't make a difference" law of addition, or the associative law of addition. Please use the literal numbers a, b, and c to state the associative law of addition.

141. Someone is multiplying 2x3x4. They first multiply 2 by 3 and get 6, and then multiply that by 4 to get 24. Then they start over and first multiply 3 by 4 and get 12, and multiply that by 2 and get 24. This is an example of the "grouping doesn't make a difference" law of multiplication, or the associative law of multiplication. Please use the literal numbers x, y, and z to state the associative law of multiplication.

142. uu uuu
     uu uuu
     uu uuu

If we think of uu uuu as representing 2 plus 3, to make 5, and the three rows of those as representing 3 times that amount, we can write

3(2+3)= 3x2 + 3x3. We have taken the group of 2 and tripled it, and the group of 3 and tripled it. Then we add together what we got from three twos (6) plus the three threes (9). We get 15. This is the same as 3 x 5. This example demonstrates a law that has to do with multiplying a number by the sum of two other numbers. You can multiply by each of the numbers in the sum, and then add the products. This general rule is called what law?

143. Please use the literal numbers x, y, and z to write the distributive law.

144. Someone is given the expression 3(x+y). The person substitutes for this, the expression 3x + y, thinking that this is equal to the original expression. Which law did the person break?

145. If you're given the expression 3(x+y) and you want to substitute for it an expression without parentheses, what's the correct expression to use?

146. Someone says, "The distributive law says that a(b+c)=ab+ac. I'm going to use the 'order doesn't make a difference' or commutative law of multiplication, to figure out what (b+c)a equals. Since order doesn't make a difference, it too has to equal ab + ac. Or we could also say it equals ba+ca." Is this person right?

147. A teacher asks students to write the formula for the perimeter of a triangle, or the distance all the way around it, back to the starting point. Most students write, "P=a+b+c, where P stands for perimeter and a, b, and c stand for the lengths of the 3 sides." One student writes, "PERI=h+k+q, where PERI stands for perimeter and h, k, and q stand for the lengths of the 3 sides." Is that student correct or incorrect?

148. X represents a number. X + 3 = 10. What is X?

149. 2X = 16. What is X?

150. Y = X + 1. If X = 3, what is Y?

151. Y = 2X. If X=200, what is Y?

152. Suppose we have a function that goes like this: "First multiply the number by three and then add 4." Someone tries to write that by literal numbers. The person writes,

Y= 3X + 4.

Did the person succeed?

153. Suppose there's a "function machine" that takes whatever number you put into it, subtracts 1 from it, and then multiplies the answer by 2. Someone tries to write that by literal numbers. The person writes,

Y=2(X-1).

Did the person succeed?

154. Suppose we have a "plus two" function. What would the inverse function be?

155. Suppose we have a "times three" function. What would the inverse function be?

Chapter 12: Rounding and Estimating with Whole Numbers

156. Someone has $986.47 invested in something that pays 5.06% interest. Without using a calculator, the person thinks, "This is going to pay me about 50 dollars a year." What's the most likely way that the person got this answer?

A. Rounded the amount invested to $1000 and rounded the interest rate to 5 percent, and figured out the answer using the rounded numbers.
or
B. Multiplied the two exact numbers in their head, coming out with a number of 8 digits, and rounded that number off to the answer?

157. What is 88 rounded to the nearest 10?

158. What is 134 rounded to the nearest 10?

159. What is 339 rounded to the nearest 100?

160. What is 43,783 rounded to the nearest 1000?

161. Someone estimates that 1,249 x 372 approximately equals 41,000. Using rounding (i.e., without multiplying this out exactly), do you think this person is close?

162. 8,000 x 20,000 =

163. 20,000 ÷ 4,000 =

164. Removing a zero from a number is the same as dividing by _____.

165. Suppose that you divide 12,394 by 435 and you get 2,849. Does that answer "make sense?"

Chapter 13: Fractions

166. What fraction of this rectangle is shaded?

167. What fraction of this rectangle is shaded?

168. If we slice an apple into 10 equal pieces, each piece is what fraction of the whole apple?

169. What is the numerator of the fraction 3/8?

170. What is the denominator of the fraction 3/8?

171. Someone adds 1/3 and 2/5 and gets 3/8. Someone tells that person, "That's not the way to add unlike fractions. You first have to change them so that they have the same _____." What should go into the blank?

A. numerator,
or
B. denominator?

172. When people add unlike fractions, and they change them so as to have the same denominator, they usually do that by

A. multiplying the top and bottom of one or both fractions by the same number?
or
B. subtracting the same number from the top and bottom of one or both fractions?

173. Someone says, 2/3 is the same (an equivalent fraction) as 4/6, and it's also the same as 6/9, 8/12, 10/15, 12/18, and bunches of other fractions. The rule that the person is illustrating is that

A. To find an equivalent fraction to any fraction, you add 2 to the numerator and 3 to the denominator.
or
B. To find an equivalent fraction to any fraction, you multiply numerator and denominator by the same number?

174. Someone says, "If we can change 2/3 into the equivalent fraction 4/6 by multiplying numerator and denominator by the same number (2), then we can change 4/6 into the equivalent fraction 2/3 by dividing numerator and denominator by the same number (2). We can make a rule that if you divide numerator and denominator of any fraction by the same number, we get an equivalent fraction." Is the

person right, or wrong?

175. Is the fraction 4/6 in its "lowest terms," or not? If it isn't, what is the fraction, reduced to its lowest terms?

176. True or false: 1 2/5 is a mixed number, and 7/5 is an improper fraction, and the two are equal to each other.

177. True or false: If you are changing 1 2/5 to an improper fraction, you make use of the fact that 1 is the same as 5/5, and when you add 5/5 and 2/5 you get 7/5.

178. 2/5 + 1/5 =

179. 3/7 + 4/7 =

180. 4/5 - 2/5 =

181. 1/2 = _?_/4

182. 2/3 = _?_/9

183. 6/12 = _?_/6 = 1/_?_

184. What is the fraction 18/24 reduced to its lowest terms?

185. Which is bigger: 1/3 or 1/5?

186. Which is bigger: 3/5 or 2/9?

187. Which is bigger: 3/4 or 7/14?

188. What does 3/3 equal?

189. 2/3 + 1/4 =

190. What is the easiest common denominator of 1/4 and 3/5?

191. What is the least common denominator of 1/12 and 1/18?

192. The mixed number 2 2/5 equals what improper fraction?

193. The improper fraction 23/3 equals what mixed number?

194. The whole number 4 equals the improper fraction _?_/2.

195. The improper fraction 3/1 equals what whole number?

196. 3 2/7 + 4 3/7 =

197. 4 2/3 - 1 1/6 =

198. 7 - 1 2/5 =

199. 1/2 x 1/3 =

200. 5 x 1/6 =

201. 2/3 x 3/5 =

202. What's the rule for multiplying two fractions? _____ times _____ over _____ times _____.

203. What's the rule for dividing fractions? _____ the divisor and _____.

204. The problem is, 4/3 divided by 1/3. Someone remembers, "invert and multiply." Which of the two numbers should they invert: the 4/3, or the 1/3?

205. What is one half of one fourth?

206. The problem "What is one half of one fourth" illustrates that when we're talking about fractions, usually "Of means _____."

207. 1 1/2 x 2 1/5 =

208. What is 5 x 13 x 1/13?

209. 3/5 x 5/8 =

210. 1/9 x 6/7 =

211. What is the reciprocal of 2/3?

212. 2/3 ÷ 3/4 =

213. What is the reciprocal of 2 2/5?

Chapter 14: Decimals

214. In the number 14.718, the digits 7, 1, 8 mean what?

the digit 7 in that number means 7 tenths.

the digit 1 in that number means is 1 _____.

the digit 8 in that number means 8 _____.

215. True or false: The decimal 0.3, which means 3 tenths, is equal to 0.30, which means 30 hundredths, and is also equal to 0.300, which means 300 thousandths.

216. True or false: In the number 0.36, the digit 3 that means 3 tenths also means 30 hundredths.

217. True or false: We can read the number 0.36 as thirty-six hundredths.

218. True or false: We can read the number 0.036 as thirty-six thousandths.

219. True or false: 0.08 and 0.80 mean the same thing and are equal.

220. What is 0.123 X 10?

221. What is 0.123 x 100?

222. What is 89.4 divided by 10?

223. What is 89.4 divided by 100?

224. Someone adds 0.03 and 0.1 and gets 0.04. What did the person do wrong?

225. What is the correct answer to 0.03 plus 0.1?

226. Someone is trying to subtract 2.48 from 7.2. They write 7.2 on top and line up the decimals. What should they do to make both the numbers have the same number of decimal places, before subtracting?

227. What do you get when you subtract 2.48 from 7.2?

228. Someone multiplies 3.5 by 8.7. When they ignore the decimal points and multiply 35 x 87, they get 3,045. What should they do to 3,045 to get the answer to their original problem, 3.5 x 8.7?

229. When you multiply two decimal numbers, what's the general rule about how you figure out where to put the decimal point in the product?

230. When you divide a decimal by an integer (whole number), you can just ignore the decimal point and divide, and then put the decimal point in the answer, right above what?

231. Someone divides a decimal by an integer. But when they put the decimal point into the quotient above the decimal point in the divisor, there are several blank columns between the decimal point and the answer the person got. The person should fill in those columns with what?

232. When you are dividing by a decimal, and you just move the decimal a certain number of places to

the right to turn that divisor into a whole number, what do you do to the decimal point in the dividend?

233. If you have a calculator and you want to change any fraction to a decimal, how do you do it?

234.What is 0.875 rounded to the nearest hundredth?

235. What is 0.875 rounded to the nearest tenth?

236. What is 0.1 x 0.7?

237. What is 6.0 - 1.25?

238. What is 7.3 + 0.06?

239. True or false: 2.5 divided by 0.5 is the same as 25 divided by 5?

240. What is 0.36 divided by 0.06?

241. Someone is multiplying 0.17 by 0.21. They ignore the decimal points and multiply 17 by 21 and get 357. They think of 357 as 357.0, or as 357. , and they move the decimal point in 357. a certain number of places to the right or left to get the right answer to their original problem. How many decimal places do they move, and in which direction? What answer should they get?

242. Someone changes 1/7 to a decimal, and they get

0.1428571428571428571... that goes on forever. Why isn't this a problem?

A. Because a computer can store an unending, or infinite, series of digits.
or
B. Because you can just round off the decimal to however many places you want, depending on how accurate you want the answer.

Chapter 15: Introduction to Solving Equations

243. What is 3x - 2 when x=7?

244. What is 10 - 4x when x=2?

245. What do we have to do to X + 10, to result in X?

246. What do we have to do to 5*X, to result in X?

247. What do we have to do to X-10, to get X?

248. What do we have to do to X/3, to get X?

249. If someone is trying to solve the equation,   X + 1 = 8,

the person might think, "I just know the answer right off. It's 7." But if the person wanted to solve the equations using the Golden Rule of Equations, they would _____(add, subtract, multiply, divide?) _____ (what number?) to or from or by both sides of the equation?

250. If someone uses the Golden Rule of Equations to solve 5X=35, what do they do to both sides of the equation?

251. Suppose we have the equation 3X + 2 = 14.

What do we get after we subtract 2 from both sides of the equation?

A. 3X = 12
or
B. 3(X-2) = 16?

252. We have the equation, 5X - 5 = 20.

As a first step, we add 5 to both sides of the equation and get

5X = 25.
Now please do something to both sides of the equation to find what X equals.

253. Someone solves the equation 4X + 2 = 30, and gets an answer of 7. How would you use substitution, instead of solving the equation over again, to check their answer?

A. Subtract 2 from both sides and get 4X = 28, and divide both sides by 4 to get X = 7.
or
B. Substitute 7 for X and get 4*7 + 2 on the left side, which comes out to 30, and see that this is the same that you have on the right side. So 7 is the number that you can substitute for X that makes the equation true.

254. Please solve the equation x/7 + 2 = 6. First subtract 2 from both sides of the equation, to get

x/7 = 4.

Now please multiply both sides of the equation by 7. X/7 * 7 gives us just X on the left side. What answer do you get on the right side?

255. Please solve the equation x/2 + 1 = 6. First subtract 1 from both sides, and then multiply both sides of what you get, by 2.

256. An equilateral triangle is one where the three sides are equal in length. The perimeter of a triangle is the distance all the way around it, or the sum of the distances of all three sides. Since for an equilateral triangle, all the sides are equal, the formula for the perimeter is

P=3L, where P is the perimeter, and L is the length of a side.

We can rewrite this as

3L = P.

Can you use the golden rule of equations to divide both sides of this equation by 3, and get a formula for what the length of the sides are, given the perimeter of an equilateral triangle?

Chapter 16: Percents

257. Percent means _____ths. For example, 37% is the same as a fraction where 37 is the numerator and what is the denominator?

258. Suppose we divide the number of people who support a certain candidate by the total number that we poll, and we get 0.47. We might say, 0.47 of the people we polled support this candidate. How would we say that using the language of percent?

259. 0.56 is what percent?

260. 75% is what decimal?

261. A certain number is 1.5 times as much as a second number. Can we follow the rule of moving the decimal point two places to the right, and say that the first number is 150% of the second number?

262.If we want to find what 37% of $50 is, we should multiply 50 by what?

A. 37
or
B. 0.37?

263. If we want to find out what percent 12 is of 48, what should we do?

A. Divide 12 by 48, and move the decimal point two places to the left.
or
B. Divide 12 by 48, and move the decimal point two places to the right.

264. A coat ordinarily costs $50, but they have taken 10% off the price of the coat. How would someone figure out how much the coat costs after the discount?

A. Multiply $50 by 0.10, and subtract what you get from $50.
B. Subtract 10% from 100%, change what you get to a decimal, and multiply by $50.
C. Either of those two ways gives you the right answer.

265. The value of someone's house starts out at $250,000 and increases by 20%. How might someone figure out how much the house is worth after the increase?

A. Multiply $250,000 by 0.20 and add what they get to $250,000.
B. Add 20% to 100%, change that to a decimal (1.2), and multiply that by $250,000.
C. Either of those two ways gives you the right answer.

266. Someone lends $100,000 to a bank by buying a "certificate of deposit." After 1 year, the person gets the amount they lent back, plus an additional 5% as interest. Please use each of the following methods to figure out how much the person gets back after the year.
a. Multiply the $100,000 by 0.05 and add that to $100,000.
b. Add 5% to 100%, get 105%, change that to a decimal, and multiply by $100,000.
Do you get the same thing?

Chapter 17: Measures

267. Does it make sense to add 100 miles and 2 hours?

268. Does it make sense, if someone has gone 100 miles in 2 hours, to divide and get that they traveled an average of 50 miles an hour?

269. If someone can average 50 miles/hour and they go 3 hours, and you want to know how far they go, does it make sense to multiply the two together, including the units, and "cancel" the hour unit in the denominator and numerator, to get an answer of 150 miles?

270. Someone says, "If I want to convert a certain number of feet to an equivalent number of inches, I multiply the number of feet by 12 inches/foot. The unit of feet in the numerator and denominator cancel out, and I get the answer in inches. For example,

4 feet   x   12 inches/foot = 48 inches."

Is the person correct, or not?

271. Someone says, "If I want to convert a certain number of inches to an equivalent number of feet, I multiply the number of inches by 1 foot/ 12 inches. The number of inches in the numerator and denominator cancel out, and I get the answer in inches. For example,

48 inches x 1 foot/12 inches = 4 feet."

Is the person correct, or not?

272. There are 3 feet in a yard. If someone wants to change 4 yards to the equivalent number of feet, they should multiply by

A. 3 feet/yard,
or
B. 1 yard/ 3 feet?

273. If someone wants to change 12 feet to the equivalent number of yards, they should multiply by

A. 3 feet/yard,
or
B. 1 yard / 3 feet?

274. Someone says, "If I want to convert Unit A to Unit B, I multiply by a "conversion factor" that has Unit A in the denominator. For example, if I want to convert feet to inches, I multiply by 12 inches /foot. If I want to convert inches to feet, I multiply by 1 foot/12 inches."

Is the person correct, or not?

275. Someone is 62 inches tall. Someone multiplies 62 inches by 1 foot/12 inches and gets that the person is about 5.17 feet tall.

But suppose that instead, when the person multiplies 62 by 1/12, they divide 12 into 62 and get 5 feet, with a remainder of 2. What does the remainder of 2 mean?

A. It doesn't mean anything, it's just a remainder of 2.
or
B. It means that the person is 5 feet, 2 inches tall!

276. If someone is 4 feet, 13 inches tall, we would usually think of those 13 inches as 1 foot and 1 inch. So how would we usually express how tall the person is?

277. Suppose someone is 3 feet, 7 inches tall, and increases their height (over a few years) by 2 feet, 8 inches. What's the best way to express how tall they are after growing?

A. 5 feet, 15 inches tall
B. 6 feet, 3 inches tall.

278. Suppose we worked 5 hours and 10 minutes one day, and 50 minutes less than that the next day. Someone wants to figure out how much we worked the second day. To subtract, what would they change 5 hours and 10 minutes into? The answer is 4 hours and _____ minutes.

279. How many hours and minutes are there between 9 a.m. and 5:30 p.m.?

280. How many hours and minutes is 3 times as long as 1 hour and 30 minutes? (If you get 3 hours and 90 minutes, please change that to a number of hours and minutes where the number of minutes is under 60.)

Chapter 18: Ratios, Rates, and Proportions

281. If we say that the ratio of boys to girls in a class is 2, or 2 to 1, we mean that

A. There are 2 boys and 1 girl in the class.
B. There are 2 more boys than girls in the class.
C. There are 2 times as many boys as girls in the class.

282. If the ratio of married people to single people in a certain group is 2/3, what is the ratio of single

people to married people?

283. Someone tells you, "The ratio of English speakers to Spanish speakers in a certain group is 3/5, or 3 to 5." Suppose you want to know what percent of the group speaks English. You reason that for every 3 English speakers, there are 5 Spanish speakers, or in other words out of every 8 people, 3 speak English. You reason that therefore 3/8 of the group are English speakers. You divide 3 by 8 and get 0.375, move the decimal two places to the right, and say, "The group is 37.5% English speakers." Did you reason correctly?

284. Suppose the ratio of the weight of sugar to the weight of everything else in a recipe is 2/3. What percent of the stuff made by the recipe is sugar?

285. Suppose a certain animal shelter has 20% of its residents as dogs, and 80% as cats. What's the ratio of cats to dogs in this shelter?

286. At a certain time, a meter stick (100 cm long) casts a shadow that is 60 cm long. At the same time, a flagpole casts a shadow that is 12 meters long. How long is the flagpole?

287. What is x in the following equation?

$x/3 = 15/5$

288. Someone cycles 30 kilometers in 80 minutes. At that rate, how far can the person cycle in two hours?

289. Someone walks up 4 flights of stairs in 60 seconds. If the person keeps going at that rate, how many minutes and seconds will it take for the person to go up a total of 11 flights?

290. Someone types 40 words per minute. How long will it take for the person to type an essay of 1200 words?

291. Someone types 900 words in 30 minutes. What is the rate that the person typed, in words per minute?

292. Someone types at 50 words per minute. They type for 20 minutes. How many words do they type?

293. Think about how fast people type, and how long it takes for them to type 1000 words. Are the rate of typing and the time it takes directly proportional, or inversely proportional?

294. Someone says, "The rate of lung cancer in various groups of people is inversely proportional to the amount of cigarette smoking in the group." Do you think the person is right, or do you think the person should have said, "directly proportional?"

Chapter 19: Negative Numbers

295. Suppose that the temperature is 5 degrees Celsius, and the temperature drops by 11 degrees. What's the temperature then?

296. Suppose that the temperature is negative 5 degrees Celsius (also known as minus 5 degrees, or 5 below zero). The temperature drops 11 degrees. What's the temperature then?

297. Suppose that all the money a person has is 700 dollars. We say that the person's "net financial worth" is 700 dollars. The person pays their rent, which is 1000 dollars, by borrowing money. And the person doesn't get any money or spend any money otherwise. What is the person's net financial worth after they pay the rent?

298. Suppose a person has a net financial worth of negative 1000 dollars. The person works hard enough to earn 2500 dollars. If the person doesn't spend or earn any other money, what's the person's net financial worth after they earn the money?

299. Suppose someone rates their happiness on a scale from +10 to -10, where 0 is neutral, +10 is very happy, and -10 is very unhappy. The person is happy +2 on this scale -- a little happier than neutral. Then the person's significant other breaks up with them, which causes the person's happiness rating to drop by 9 points. What's the person's happiness rating after the breakup?

300. Suppose a city is 1 meter above sea level. Because the city uses up the underground water, and the land settles into the spots where the water used to be, the city goes down 2 meters. What's the new position of the city relative to sea level?

301. True or false: the absolute value of +10 is equal to the absolute value of -10.

302. What is the absolute value of +46? What is the absolute value of -46?

303. Here's an equation: |x| = 7. How many solutions are there to this, and what are they?

304. True or false: 10 - 7 is the same as 10 + -7?

305. True or false: 6 - 4 is the same as -4 + 6?

306. Subtracting a number is the same as adding its

A. opposite
B. inverse
C. reciprocal?

307. True or false: 10 - (-7) is the same as 10 + (+7).

308. True or false: When adding two numbers of opposite signs, you subtract the absolute values, and the answer has the sign of the addend with the larger absolute value. An example of this is -10 + 7 = -3.

309. True or false: When adding two numbers of the same signs, you add the absolute values, and the answer has the same sign as the addends. An example of this is -2 + -3 = -5.

310. Someone says: "If the temperature drops by 2 degrees, 4 times in a row, the total change in temperature is -8 degrees. This illustrates that -2 * 4 = -8." Is the person correct?

311. When you multiply something by a negative number, as in 4*-2, the answer you get is the opposite of what you would get if you multiplied 4*2. So multiplying a positive number by a negative changed the sign to negative. If we follow the rule that each change in sign in the factors changes the sign of the product, what should happen if we change 4*2 into -4 * -2?

A. The sign of the product changes to its opposite twice, which gets it back to positive, so the answer is +8.
B. It is not possible to have a negative number added up a negative number of times, so there is no answer.

312. Is it always true that a positive number * a negative number is negative, and a negative * a negative is positive?

313. If we make the reciprocal of a number, does the reciprocal have the same sign as the original number?

314. What is the reciprocal of - 1/3?

315. What is -6 / -3?

316. What is -15 / 3? Is it the same as 15 / -3 ?

317. Will the answer to (+10) * (-5) * (-37) * (- 1/63) be positive or negative?

Chapter 20: Using Negative Numbers in Solving Equations

Please solve each of the following equations for x:

318.   -x = -5

319. -6x=42

320. -7x - 3 = -66

321. -4x -5 = -7x + 4

322. 10-2x=-5(x+1)

Hint: first get rid of the parentheses on the right side by using the distributive law.
Then use the golden rule of equations to get all the terms with an x in them on the left side, and all the numbers without an x in them on the right side.
Then add so that you have a certain number * x on the left side, and a certain number on the right side.
Then divide by the coefficient of x to get the answer.

323. 14-4x = 6(x+4)

324. 21 / -x = 7

325. How many terms are in the following expression?

6x + 4y - 7 + 14x

326. How many factors are in the following expression?

17xy(p+4)

327. When someone sees 6x + 3x in an expression and simplifies it to 9x, the person is using

A. the distributive law to combine the coefficients of the variable x. [The distributive law says that ba + ca = (b+c)a].
or
B. the fact that the reciprocal of any number has the same sign as the number itself.

328. In the expression 17y, what's the coefficient of y?

Chapter 21: Solving Inequalities

329. Someone says, "When you solve inequalities, you use the same golden rule that you used with equations. You can add, subtract, multiply, or divide both sides by the same number, and the inequality remains true." The person is not quite right about this. What has the person forgotten?

330. When you solve an inequality, the answer is usually

A. One number,

or

B. A set of numbers?

Please solve the following inequalities.

331. x+2 >7

332. 4x + 3 > 23

333. -x < 20

334. 3 - 2x > 19

335. 5 - 1/x > 10   (Remember to first assume that x is positive, and solve, then assume x is negative and solve.)

336. 4/x <= 1 (<= is "less than or equal to.")

Chapter 22: Means and medians

337. Suppose we have a bunch of numbers that we want to describe. The number that would have resulted if the total of all the numbers were divided out evenly among all the numbers is called the

A. mean

or

B. median?

338. To find a mean of a set of numbers, you first add some things and then you divide by something. What do you add up, and what do you divide by?

339. Suppose there are 10 people with an average weight of 70 kilograms. If you were to put all 10 people on a very big scale, how much would they weigh altogether?

340. The average of 4 numbers is 5. What's the total of the numbers?

      When one more number is newly included in the set, now the new average of the 5 numbers is 6. What's the total of the 5 numbers that are now in the set?

Can you subtract the total of the first set from the total of the second set, and thereby answer the question, "What was the number that was newly included in the set?"

341. Suppose that, in order to describe the weights of a group of people, you take each of their weights and arrange them in order from lowest to highest. Then you pick the weight that is in the middle, as a representation of a typical weight for the group. The number you are picking is called the

A. Mode

B. Median

C. Mean

342. What's the median of the following numbers? 1, 2, 3, 4, and 5.

343. What's the median of the following numbers? 5, 3, 1, 2, and 4.

344. Suppose that there is a group of people whose best times in the 200 meter run are 40 seconds, 41 seconds, 42 seconds, and 23 seconds.

        A. Which number better describes the running ability of the majority of the members of this group: the mean, or the median?

        B. Which number better predicts whether these four people would win a 4 person relay race in which each of them runs 200 meters (where they win if the total time is least) -- the mean, or the median?

345. There are 100 people who take a test, and someone has a score that is greater than or equal to 75 of them. What percentile is the person's score in?

346. There are 200 people who take a test, and someone has a score that is greater than or equal to that of 50 of them. What percentile is the person's score in?

347. For which would you rather be in the 90th percentile: income, or depression score?

348.Which would you rather have for your happiness rating score (where higher is happier): a score in the 90th percentile for prisoners, or a score in the 50th percentile for a peaceful village where people have long life spans?

Chapter 23: The Fundamental Counting Principle

349. A certain restaurant has a very small menu. You can get any of 3 types of vegan stew, called stew A, stew B, or stew C. To drink, you can get either tea or water. How many different possible orders can someone give? (At this restaurant, you can't get a stew without a beverage or a beverage without a stew.

You must pick one of each if you're going to order at all.)

350. Three people are getting in line. How many way can you pick the first person in line? _____
After that, from the people that are left, how many ways can you pick the second person in line?_____

After that, from the people who are left, how many ways can you pick the third person in line? _____

If you use the fundamental counting principle, in how many different orders can the people line up? _____

351. There is a club with 9 people in it. They are picking a president, vice-president, secretary, and treasurer. No one can have more than one job, no job can have more than one person, and everyone is willing to do any of the jobs. How many ways can they make their selection?

352. There's a club with 9 people in it. Two people get selected for cleaning up the clubhouse after the meeting. Their cleaning jobs are identical to each other. In other words, "Order doesn't make a difference" in their selection.

One person says, "There are 9 ways to pick the first, and 8 ways to pick the second. So I use the fundamental counting principle and got 72."

The second person says, "There are 72 ways of picking them. But that counts, for example, Joe picked as the first person and Bill picked as the second person, as a different possibility than Bill picked first and Joe picked second. So for each pair, there are two ways they could be picked. So the number 72 is twice as big as it needs to be when order doesn't make a difference. So I divided 72 by 2 and got 36 ways to pick a pair of people."

Which person is right, the first, or the second?

353. There's a club with 5 people. Only 4 get to participate in the math workshop. They are all wanting to go very much, so they choose with a lottery. How many ways can they choose 4 people to go?

The first person says: "I figured there are 5 ways to choose the first, 4 the second, 3 the third, and 2 the fourth. 5 * 4 * 3 * 2 gives 120 ways to pick them in order. But since order doesn't make a difference, I figured that for each set of 4, we could put them into order in 4 * 3 * 2 * 1 ways, or 24 ways. When I divided 120 by 24, I got 5. So there are 5 ways to pick which group goes."

"The second person says: I just reasoned that if I picked the person who couldn't go, the rest were the group who could go. So I asked myself, how many ways are there to pick one person out of 5? The answer is 5. So I got the same answer you did."

Did both of them reason correctly, and did both get the right answer?

354. A third person says, regarding the previous problem, "I did what the first person did, only I didn't multiply out the numbers -- I made fraction and did some canceling. I got

(5 * 4 * 3 * 2 * 1) / (4 * 3 * 2 * 1).

When I canceled the numbers that were the same on top and bottom, I got 5 also.

Did this person use a correct way of saving some work?

355. Someone likes to solve puzzles that require unscrambling words. One of the scrambled words in the puzzle is SKANTH. The person makes a computer program that randomly presents the letters in different orders, not picking the same order twice. How many different possible answers does the person have to look at before person can be absolutely sure of seeing the correct order? (In other words, how many permutations can be made of those letters?)

356. Which of the following is true:

A. For permutations, order makes a difference; for combinations, order doesn't make a difference.

or

B. For combinations, order makes a difference; for permutations, order doesn't make a difference.

357. Why does the author think that in the best of all possible worlds where everything is done correctly, we would call "combination locks" "permutation locks" instead?

Chapter 24: Probability

358. There are 4 red poker chips in a box, and there are 21 poker chips in the box altogether. If they are mixed up so each is equally easy to pick, and someone picks one without looking, what's the probability of picking a red chip?

359. When there are 4 red chips and 21 chips in all, what's the probability of picking a chip other than a red chip?

360. There are 4 red chips in a box and 7 blue chips, and no other ones. Someone says, "The probability of picking a red chip is 4/7." Is the person right? If not, how would you correct the person?

361. There are 4 red chips, 7 blue chips, and 6 white chips, and someone is picking one at random. What's the probability of picking a red chip? The probability of picking a blue chip? The probability of picking a red OR blue chip?

Is the probability of picking red or blue in this problem the sum of the probabilities of picking red and picking blue?

In this problem, are picking red and picking blue mutually exclusive?

362. Someone considers driving at 95 miles an hour on a highway. Which is more relevant to this person's decision:

A. The overall probabilities of death and injury.

or

B. The conditional probabilities of death and injury, given driving at 95 miles an hour, compared to the conditional probabilities given driving at a lower speed.

363. When you have a problem that asks you to find that probability that something happens "at least once," what's the easiest way to solve it?

A. Find the chance that it happens once, twice, three times, and so forth, and add those probabilities together.

B. Find the chance that it doesn't happen at all, and subtract that from 1.

364. If you flip five coins, what's the probability that you'll get all tails? What's the probability that you'll get heads at least once?

365. Are the events of rolling a 1 and rolling a 2 on one die roll independent or mutually exclusive?

366. Are the events of rolling a 1 and rolling a 2 on two separate die rolls independent or mutually exclusive?

367. With one die roll, what is the probability of rolling either a 1 or a 2?

368. With two die rolls, what is the probability of rolling a 1 on the first roll and a 2 on the second?

369. Someone states that alcohol drinking is a risk factor for serious liver disease. What do they mean, expressed by conditional probabilities?

A. The conditional probability of alcohol drinking is below a certain amount.

B. The conditional probability of serious liver disease giving alcohol drinking is greater than the conditional probability of serious liver disease given absence of drinking.

Chapter 25: Exponents

370. Does 5^3 equal 5 times 2 more 5s, or 5 times 3 more 5s? (5*5*5 or 5* 5*5*5?)

371. In the expression 5^3, which is the base and which is the exponent?

A. 5 is the base and 3 is the exponent.

B. 3 is the base and 5 is the exponent.

372. What is $2^{11} * 2^5$? (Express the answer as 2 to some power.)

373. What is $2^{11} / 2^5$? (Express the answer as 2 to some power.)

374. Someone invests $1000 at 6% interest, compounded each year. How much does the person have at the end of 50 years? (On one type of cell phone, the calculator will do exponents if you hold the phone horizontally. To do, for example, 2^3, you type 2 x^y 3.)

375. What is $7^5 / 7^2$?   What is $7^5 * 7^{-2}$? Do these results illustrate anything about the meaning of negative exponents?

376. What is 5^1? What is 5^0?

377. What is 40,000 in scientific notation?

378. What is 0.0004 in scientific notation?

379. What is 0.00215 in scientific notation?

380. What is 62,000,000 in scientific notation?

381. What is $4.3 * 10^4$, or 4.3E4, in standard notation?

382. What is 2E4 * 3E7?

383. What is $(2^2)^3$?

384. What is $(2^5)^7$?

385. True or false: $(2x)^3 = 8x^3$.

386. True or false: $(40xy)7 = 40^7 * x^7y^{7.}$

387. Please use what we've called a fifth law of exponents to express this in a different form: $(p/q)^5$.

Chapter 26: Finding Areas of Parallelograms, Triangles, Trapezoids, and Circles

388. Imagine a rectangle. Are the two line segments that come together at one of the corners of the rectangle perpendicular, or parallel?

389. Imagine a rectangle. Are the two line segments in it that are across from one another, and don't touch, perpendicular or parallel?

390. What is the formula for the area of a rectangle?

391. Perpendicular lines form angles of how many degrees?

392. If you add up the number of degrees of each of the three angles of a triangle, what number do you always get?

393. There's a parallelogram with one side 10 and the other side 5. Is the area of that parallelogram 10 * 5, or 50 square units?

394. There's a parallelogram with one side 10. A straight line dropped from a corner so as to be perpendicular to 10 unit long side, and go to it, is 3 units long. Is the area of that parallelogram 10 * 3, or 30 square units?

395. A triangle has a base of 10 meters and a height of 5 meters. What's its area?

396. A trapezoid has a height of 5 meters, and the sum of the two parallel sides is 10 meters. What's its area?

397. Pi, or about 3.14, is the ratio of what, to what, in a circle?

398. If the distance all the way around the circle, back to the starting point, a.k.a. the circumference, is pi meters, what's the length of the diameter of the circle?

399. If the radius of a circle is 5 meters long, about how long is the circumference?

400. If the formula for the circumference of a circle, given the diameter, is C=pi * d, what's the formula for the circumference given the radius of the circle?

401. If you take a bunch of pizza slices and alternate them to make a shape somewhat like a rectangle, what are the length and width of that rectangle, in terms of pi and r?

402. What's the formula for the area of:

      A. a rectangle,

      B. a parallelogram,

      C. a triangle,

      D. a trapezoid,

      E. a circle?

Chapter 27: Roots and Fractional Exponents

403. The square root of x is that number which, when multiplied by _____, or in other words raised to the _____ power, gives _____.

404. The nth root of x is that number which, when raised to the _____ power, gives _____.

405. Can you think of an example where the square root of a number is greater than the number itself? (This has to be a circumstance where squaring a number gives you a number less than the number you squared.)

406. What's the difference between rational and irrational numbers?

407. Are the square roots of all integers that are not perfect squares, irrational numbers?

408. Is the square root of -25 a real number? Is it an imaginary number?

409. If you take $x^{1/n}$ and raise it to the nth power, what do you get? (Use the law of exponents that has to do with raising an exponent expression to a power.)

410. The fact that $(a^{1/b})^b = a$ tells us that $a^{1/b}$ is the same as the _____th root of _____.

411. What is $27^{2/3}$?

412. True or false: The square root of ab is the square root of a times the square root of b.

413. True or false: The square root of a + b is the square root of a plus the square root of b.

414. True or false: The square root of a/b is the square root of a / the square root of b.

415. True or false: The square root of p^n is $p^{n/2}$.

Chapter 28: The Cartesian Coordinate System

416. In a Cartesian coordinate system, what do we call the place where the abscissa and the ordinate cross each other? (In other words, what do we call the place where the x-axis and the y-axis cross?)

417. Imagine that there is a big coordinate system and that you and someone else are standing at the origin. Can you explain to the other person how to get to the point called 5, 1? How about to the point called -5,-1?

418. The four quadrants go 1, 2, 3, 4, in order, from upper right to upper left to lower left to lower right. For points that are located in those quadrants, please tell whether x and y are positive or negative. For example: in quadrant 1, x is positive and y is positive. How about for quadrants 2, 3, and 4?

419. What are the rise and the run for the two points -2, -1 and 3, 3? What is the slope of the line that

goes through these points?

420. What are the rise and run, and the slope, for the line going through two points: 1,0 and -2, -2?

421. When you look at a graph, you see lines going horizontally and vertically, and you see little squares that those lines make, and points where the lines cross each other. Is the Cartesian coordinate system designed to locate points, or squares? Why is this a good idea?

422. What is the formula for the slope of a line, given two points x1, y1, and x2, y2?

423. For a line with a positive slope, do the y values get greater as you go toward the right, or toward the left?

Chapter 29: Using Cartesian Coordinate Systems to Make Pictures of Functions

424. Please check to see whether the point 6,12 obeys the function rule of y=3x + 2.

425. Please check to see whether the point 6, 12 obeys the function rule of y= 3x - 6.

426. For the function y=5x - 10, if x is 7, what is y?

427. True or false: When you graph a function, and the result is a straight line, every point on that line obeys the function rule for the equation of that line.

428. What is the meaning of the y-intercept of a line (or a linear function)?

429. For the equation y=5x +2, what is the slope and what is the y-intercept?

430. For the equation y=mx + b, what is the slope and what is the y-intercept?

431. Someone knows that the slope of a line is 2 and a point on that line is 4, 6. The person wants to find the y intercept. They substitute 6 for y, 4 for x, and 2 for m. They get

6= 2*4 +b

6=8+b

b= -2.

So they know the y-intercept is -2.

Now they know that the equation for the line is y=2x-2. They check and see that the point 4,6 satisfies this.

Did they do this right?

432. Please find the equation for a line with slope 5, where one of the points is 2, 13.

433. Please find the equation for a line with two points 2,7 and 4,13.

434. What are the slope and intercept of a line with the following equation:

10x + 5y = 1

435. What shape does the graph of the function 43x - 76y= 3.1415 take?

436. What is the shape of the graph of the function, $y=15x^2 + 4x -6$?

Chapter 30: The Pythagorean Theorem and the Distance Formula

437. What sort of triangle does the Pythagorean Theorem apply to?

438. What is the Pythagorean Theorem?

439. The hypotenuse of a right triangle is 10 cm long, and one of the other sides is 8 cm. What's the length of the third side?

440. What is the distance between the two points 17,17 and 18,18?

441. What is the distance between the two points 2,3, and -1, -1?

Chapter 31: Multiplying Binomials and the Foil Rule

442. If someone multiplies the two binomials (a+b) and (c+d), to get a sum of 4 products, ac+ad+bc+bd, what law are they using to get this result?

443. For the FOIL rule, what do the letters stand for?

444. Please multiply (2x+1)(3x+2) to get an answer in the form of something times x-squared, plus something times x, plus another number.

445. Please do the same thing with (3x-3)(2x-1).

Chapter 32: Some Words Used in Logic

446. What's the negation of the proposition, "Some people live forever?"

447. What's the negation of the proposition, "All males have a y chromosome?"

448. Here's a statement: "If someone is president of the US, that person is a US citizen."

What are the converse, inverse, and contrapositive of that statement?

449. Here's a statement: "If you enjoy doing math, you will get more skilled in it." What are the converse, inverse, and contrapositive of that statement?