

Answers to practice problems, Reading About Math

Chapter 1

1. 7 people will be invited. This is the union of the sets, or everyone who is in either of the groups. The invitations go to Ellen, Maria, George, Dylan, Leah, Rose, and Eddie.
2. In this case they invite two people, Maria and Dylan. This is the intersection of the two sets.
3. $A \cap B$ is $\{8, 10\}$.
4. $A \cup B$ is $\{0, 2, 8, 10, 16, 20, 32\}$
5. D. That's the only set where each of its members is in set C.
6. 741, or seven hundred forty-one.
7. One thousand 3 hundreds 0 tens 8 ones.
8. 4 is in the thousands place; 3 is in the millions place; 9 is in the tens place.
- 9.. Thirty-five million, nine hundred nine thousand, one hundred twenty-seven.
10. Eddie is 4 feet 9 inches tall.
11. True. $>$ means "greater than."
12. Leah is taller than 4 feet, 9 inches.
13. Yes, beagles are a subset of animals.
14. Yes, set A has to be a subset of Set C.
15. 17 does not equal 9. 9 does not equal 17. But 17 does equal 17.

Chapter 2: Addition

16. A -- when one number increases another.
17. We call the ones we add together addends,
18. When we add, we call the answer the sum.
19. The commutative law of addition.
20. 41
21. First add 2 and 3, and then add 4 to what we get. A.

22. Associative law -- the "grouping doesn't make a difference" law.

23. The commutative law is the "order doesn't make a difference" law.

24. The person is adding numbers that aren't in the same units. To do it correctly, they would have thought, 60 minutes is one hour. So 8 hours 1 day and 1 hour the next day gives 9 hours altogether.

25. The perimeter is the total distance all the way around the figure. So you just add up the lengths of all the sides, however many there are.

26. $6+7=13$

$8+9=17$

$7+8=15$

$7+5=12$

$4+9=13$

$6+5=11$

$8+5=13$

$6+8=14$

$9+6=15$

$7+9=16$

$9+5=14$

27. 19 years old.

28. 18, the sum of the lengths of the 4 sides.

Chapter 3: Subtraction

29. 9 is the minuend, 7 is the subtrahend, and 2 is the difference.

30. They are both right. One is thinking of subtraction as "taking away," and the other is thinking of it as a "difference" or a "missing addend."

31. 8

32. I start at 9 and make 4 jumps to the right: 10, 11, 12, 13. So the answer is 13.

33. I start at 14 and make 3 jumps to the left: 13, 12, 11. So the answer is 11.

34.

$4+2+6$

$2+4=6$

$6-4=2$

$6-2=4$

35.

Here are all 4:

$$\begin{aligned}2+3&=5\\3+2&=5\\5-2&=3\\5-3&=2\end{aligned}$$

36.

$$\begin{aligned}3+4&=7\\4+3&=7\\7-3&=4\\7-4&=3\end{aligned}$$

$$\begin{aligned}7+9&=16\\9+7&=16\\16-9&=7\\16-7&=9\end{aligned}$$

$$\begin{aligned}8+6&=14\\6+8&=14\\14-8&=6\\14-6&=8\end{aligned}$$

$$\begin{aligned}7+6&=13\\6+7&=13\\13-6&=7\\13-7&=6\end{aligned}$$

$$\begin{aligned}8+3&=11\\3+8&=11\\11-8&=3\\11-3&=8\end{aligned}$$

Chapter 4: Regrouping in Addition and Subtraction

37. For this you don't need regrouping.

38. When you added 5 and 6, you got a number greater than 9.

39. 54

40. 83

41. A

42. 424

43. Because 9 is greater than 7.

44. 1 ten and 17 ones

45. $54 = 4$ tens and 14 ones

46. 13 ones

47. You line them up so their rightmost digits align. This makes it come out that you are adding ones to ones, tens to tens, and so forth. If you lined them up with the leftmost digits aligned, you would for example be adding 1, 8, and 3 as if they are all thousands, when the 8 is a number of 10s and the 3 is a number of ones.

48. 34

49. 132

50. 574

Chapter 5

51. a. difference b. taking away c. movement on a number line d. missing addend

52. 12

53. \$14

54. \$14 more. This is to illustrate that when the question is "How much more than," you don't automatically subtract. You have to think about what is going on.

55. Eddie now has \$1 more than George.

56. \$12.

57. 32 degrees.

58. 45 miles from home.

59. A

60. \$3

61. B

62. 17 years old. 3 years ago same was 11; 6 years later, or now, he's 17.

63. 85 cents. He lost 115 cents altogether, and $200 - 115$ is 85. Or you could ask the intermediate question as how much did he have left after the first day's loss. in this case after the first day he had 133 cents left, and after losing 48 more, he has $133 - 48 = 85$.

Chapter 6: Multiplication

64. 18

65. 15

66. 15

67. Very similar. Rows go from left to right and columns go up and down. If you have some things arranged in rows and columns and rotate them so as to change rows to columns and columns to rows, and you do this for one of the arrangements, you have the same situation.

68. 5, 10, 15, 20, 25, 30, 35, 40, 45, 50, 55

69. 20

70. Yes 3×3 is a perfect square; 3×2 is not.

71. 9×7

72. 100,000 (1 with 5 zeroes)

73. 34,000 (3 zeros attached to the 34)

74. 4, 8, 12, 16, 20

75. Yes, because $6 \times 4 = 24$

76. Yes, because when you multiply 6 by 4, you get 24.

77. No. We can't multiply 7 by a whole number to get 44.

78. No.

79. 13 is prime. 14 is not, because it's 7×2 .

80. True, according to the associative law of multiplication, the grouping doesn't make a difference law.

81. 200 square meters.

82. 9

83. $4 \times (8 + 10) = 4 \times 8 + 4 \times 10$.

84. \$27

85. 40 miles.

86. 45

87. 920

88. 1116

89. 13653

Chapter 7

90. 10:15

91. 1:50

92. about 8:28

93. 2:20

94. The person is right!

95. This person is also right..

96. 9:33

Chapter 8: Division

97. 3 bags

98. 4 almonds apiece

99. $7 \times 3 = 21$

$3 \times 7 = 21$

$21 / 3 = 7$

$21 / 7 = 3$

100. $5 \times 6 = 30$

$6 \times 5 = 30$

$30/6=5$

$30 / 5 = 6$

101. A

102. a. 13 is the dividend

- b. 4 is the divisor
- c. 3 is the quotient
- d. 1 is the remainder

103. 8 bags. We fill 7 bags with 3 each, and have 2 left over. Since we have to pack up all the turnips, we put those 2 remaining into one more bag.

104. No possible answer to $8 \div 0$. (There is no number we can multiply 0 by to get 8.)

105. 0

106. 18

107. Here's how we do it with long division. We guess that 24 "goes into" 86 about 3 times. We try it. 3 times 24 is 72, and $86 - 72$ is 14. Since that number is less than 24 but greater than 0, our guess was right. We bring down the 4 and attach it to 14 to make 144. 144 divided by 24, we guess 6. $6 \times 24 = 144$, so there's no remainder. So the answer is 36.

108. $14 \div 3$ is 4 remainder 2.

109. 102

110. A

Chapter 9: Order of Operations

111. B

112. B

113. 17 (We multiply first)

114. 6 (We divide first).

115. 27 (We do what's in parentheses first)

116. 8 (We go left to right.)

117. 50 (Left to right.)

118. 120 (left to right, but order and grouping make no difference so we can go in any order.)

Chapter 10: Even and Odd Numbers

119. 18 is even. 27 is odd.

120. 2, 4, 6, 8, or 0.

121. 1, 3, 5, 7, or 9.

122. an even number

123. an even number

124. an odd number

125. The person is right.

126. The person is right.

127. Even

128. Even

129. Odd

130. Even

131. Odd

132. Even

133. Yes, they made a mistake, because any multiple of an even number has to come out even.

134. True. They forgot to "carry the one." The answer is 994.

Chapter 11: Literal numbers, or variables

135. Constant. It's always the same number, and can't take on different values like variables can.

136. The product.

137. $J+K = K + J$

138. $PQ = QP$

139. $A = LW$

140. $a+(b+c) = (a+b)+c$

141. $a(bc) = (ab)c$

142. the distributive law

143. $x(y+z) = xy + xz$

144. They broke the distributive law.

145. $3x + 3y$

146. Right.

147. The student's answer is correct. The important thing with literal numbers is to explain what they stand for, and not which letters you pick.

148. 7

149. 8

150. Y would be 4.

151. Y would be 400.

152. Yes, they succeeded.

153. Yes, success. The parentheses say to subtract 1 first and then multiply by 2.

154.. A "minus 2" function.

155. A "divided by three" function.

Chapter 12: Rounding and Estimating

156. A

157. 90

158. 130

159. 340

160. 44,000

161. 1000×400 is 400,000. So it looks like the person's answer is way too little.

162. 160,000,000 or 160 million.

163. 5.

164. 10

165. 12,000 divided by 400 is the same as 120 divided by 4 (knocking 2 zeroes off each). 120 divided by 4 is 30. So the proposed answer is way off.

Chapter 13: Fractions

166. $\frac{1}{2}$

167. $\frac{2}{3}$

168. $\frac{1}{10}$

169. 3

170. 8

171. B, denominator

172. A

173. B

174. Right.

175. Not in lowest terms. $\frac{2}{3}$ is the fraction reduced to lowest terms.

176. True

177. True

178. $\frac{3}{5}$

179. $\frac{7}{7}$, which is 1.

180. $\frac{2}{5}$

181. 2

182. 3

183. $\frac{6}{12} = \frac{3}{6} = \frac{1}{2}$

184. $\frac{3}{4}$

185. $\frac{1}{3}$ is bigger. $\frac{1}{3}$ is $\frac{5}{15}$, and $\frac{1}{5}$ is $\frac{3}{15}$.

186. $\frac{3}{5}$ is $\frac{27}{45}$, and $\frac{2}{9}$ is $\frac{10}{45}$. So $\frac{3}{5}$ is bigger.

187. $\frac{3}{4}$ is bigger. The easy way is to notice that $\frac{7}{14}$ is $\frac{1}{2}$, or $\frac{2}{4}$.

188. 1

189. $\frac{2}{3} = \frac{8}{12}$

$\frac{1}{4} = \frac{3}{12}$

the sum is $11/12$.

190. 20

191. 36

We go 12, 24, 36, 48 to start the multiples of 12

We go 18, 36 to start the multiples of 18, and we see we already have one that is in both groups (the intersection of the sets, if you remember chapter 1.)

192. $12/5$

193. $7 \frac{2}{3}$

194. $4 = \frac{8}{2}$

195. 3

196. $7 \frac{5}{7}$

197. $4 \frac{2}{3} = 4 \frac{4}{6}$

$1 \frac{1}{6} = 1 \frac{1}{6}$

Difference = $3 \frac{3}{6} = 3 \frac{1}{2}$

198. $7 = 6 \frac{5}{5}$

$1 \frac{2}{5} = 1 \frac{2}{5}$

difference = $5 \frac{3}{5}$

199. $\frac{1}{6}$

200. $\frac{5}{6}$

201. $\frac{6}{15}$ or $\frac{2}{5}$

202. numerator x numerator over denominator x denominator

203. invert and multiplying

204. Invert the $\frac{1}{3}$, the number you are dividing by, or the divisor.

205. Of means times. $\frac{1}{2} \times \frac{1}{4} = \frac{1}{8}$.

206. times

207. $1 \frac{1}{2} * 2 \frac{1}{5} = \frac{3}{2} * \frac{11}{5} = \frac{33}{10}$ or $3 \frac{3}{10}$

208. The easy way is to notice that $13 * \frac{1}{13} = 1$

So the answer is 5.

209. $\frac{3}{5} * \frac{5}{8} = \frac{15}{40}$

210. $\frac{1}{9} * \frac{6}{7} = \frac{6}{63}$

211. $\frac{3}{2}$

212. $\frac{2}{3} / \frac{3}{4} = \frac{2}{3} * \frac{4}{3} = \frac{8}{9}$

213. $2 \frac{2}{5} = \frac{12}{5}$. So the reciprocal is $\frac{5}{12}$.

Chapter 14: Decimals

214. 7 is 7 tenths. 1 is 1 hundredth. 8 is 8 thousandths.

215. True.

216. True

217. True

218. True

219. False. 0.08 means 8 hundredths, and 0.80 means 80 hundredths.

220. 1.23

221. 12.3

222. 8.94

223. .894 (sometimes expressed as 0.894, to make sure people see the decimal point.)

224. They added hundredths to tenths. When adding you need to line up the places so the same place values are on top of each other.

225.
$$\begin{array}{r} 0.03 \\ 0.10 \end{array}$$

equals 0.13

226. add a 0 to 7.2 to make it 7.20.

227
$$\begin{array}{r} 7.20 \\ - 2.48 \end{array}$$

answer is 4.72

228. Move the decimal point two places left, because there are a total of 2 places in the two factors that are multiplied. They get 30.45.

229. Total the number of digits after the decimal point in the numbers you're multiplying, and make that number of decimal places in the answer.

230. Right above the decimal point in the dividend.

231. Zeros

232. Move it the same number of places to the right.

233. Divide the numerator by the denominator and see what you get.

234. 0.88

235. 0.9

236. 0.07

237.. 4.75

238. 7.36

239. True.

240. 6

241. 4 places to left. They get 0.0357

242. B

Chapter 15: Introduction to Solving Equations

243. 19

244. 2

245. Subtract 10

246. Divide by 5

247. Add 10

248. Multiply by 3

249. Subtract 1 from both sides

250. Divide both sides by 5

251. A

252. We divide both sides by 5. $X=5$.

253. B

254. 28

255. $x/2 = 5$ $x=10$

256. $L=P/3$

Chapter 16: Percents

257. hundred, one hundred

258. 47%

259. 56%

260. 0.75 or just .75

261. Yes.

262. B

263. B

264. C -- either of the two ways gives the correct answer.

265. C

266. Yes, they get back 105,000 dollars. They have made \$5000 just by doing not much of anything! The catch is that they have to have 100,000 dollars that they don't need to use to pay the bills.

Chapter 17: Measures

267. No, because they are not in the same units.

268. Yes. To get a rate like this the answer is in terms of how much one unit changes for each increase in the other unit.

269. Yes, that's exactly how you calculate how far they've gone and how you handle the units.

270. Yes, correct.

271. Correct again!

272. A

273. B

274. Correct

275. B

276. 5 feet 1 inch tall.

277. B.

278. 70

279. 8 hours and 30 minutes.

280. 4 hours and 30 minutes

Chapter 18: Ratios, Rates, and Proportions

281. C

282. $\frac{3}{2}$ The ratios are sometimes called 2 to 3 ratio or 3 to 2 ratio.

283. The ratio is 80 to 20, otherwise known as $\frac{4}{1}$ or 4 to 1.

284. If there were 2 kilograms of sugar there would be 3 kilograms of everything else, to make the ratio 2 to 3. So out of every 5 kilograms total, 2 would be sugar. So $\frac{2}{5}$ of the stuff by weight is sugar. Changing $\frac{2}{5}$ to percent, we get 40%.

285. The ratio of dogs to cats is 20 to 80, or 1 to 4, or $\frac{1}{4}$.

286. $\frac{100}{60}$ as x is to 12. So $x = 12 * \frac{5}{3}$, or 20 meters high.

287. $\frac{x}{3} = 3$
 $x = 3 * 3$
 $x = 9$

288. $2 \text{ hours} * 60 \text{ min/hr} = 120 \text{ min}$

$\frac{30}{80} = \frac{x}{120}$

$\frac{3}{8} = \frac{x}{120}$

$x = 120 * \frac{3}{8}$

$x = 45$ kilometers

289. 4 flights / 60 seconds is the rate. This is the same as 1 flight per 15 seconds, or 15 seconds per flight.

$15 \text{ seconds/flight} * 11 \text{ flights} = 165 \text{ seconds.}$

165 seconds * 1 minute /60 seconds = 2 minutes remainder 45 seconds
So it would take the person 2 minutes 45 seconds.

290. 1200 words * 1 minute/40 words = 30 minutes

291. 900 words / 30 minutes = 30 words/minute

292. 50 words/minute * 20 minutes = 1000 words

293. The faster they type, the less time it takes them. So the time is inversely proportional to the speed of typing.

294. The rate of lung cancer goes up, the more smoking there is. The person should have said "directly proportional."

Chapter 19: Negative Numbers

295. $5 - 11 = -6$ The temperature is negative 6 degrees, or 6 degrees below zero.

296. $-5 - 11 = -16$ The temperature is negative 16 degrees, or 16 degrees below zero.

297. $\$700 - \$1000 = -\$300$. The person's net financial worth is negative 300 dollars.

298. $-1000 + 2500 = 1500$ so the worth is \$1500.

299. $2 - 9 = -7$. So the happiness rating is negative 7 on this scale.

300.

301. True. The absolute value of each is +10, or 10.

301. $1 - 2 = -1$ The city is -1 meter above sea level, otherwise known as 1 meter below sea level. If it borders the sea, it's underwater now, unless the people built a lot of dams and dikes.

302. 46, also known as +46, is the absolute value of each.

303. There are 2 numbers that have an absolute value of 7: +7 and -7.

304. True. Subtracting a number is the same as adding the opposite of the number.

305. True. This is true because of the commutative law of addition.

$$\begin{aligned} 6 - 4 &= 6 + -4 \\ &= -4 + 6 \end{aligned}$$

306. A. opposite

307. True, because subtracting -7 is the same as adding its opposite, or 7.

308. True.

309. True.

310. Correct.

311. A

312. Yes, always.

313. Yes.

314. -3

315. 2

316. -5. Yes, the same.

317. Negative. Each time you multiply by a negative, you change the sign. So an even number of negatives makes the product positive, and an odd number makes the product negative.

Chapter 20: Using Negative Numbers in Solving Equations

318. $x=5$ (We multiplied both sides by -1.)

319. $x=-7$ (Divided both sides by -6.)

320. $-7x - 3 = -66$

$$-7x = -63$$

$$x = -9$$

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

$$3x - 5 = 4$$

$$3x = 9$$

$$x = 3$$

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

$$10 - 2x = -5x - 5$$

$$10 + 3x = -5$$

$$3x = -15$$

$$x = -5$$

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

$$14 - 4x = 6x + 24$$

$$-10x = 10$$

$$x = -1$$

$$324. 21/-x = 7$$

$$-7x=21$$

$$x=-3$$

325. 4 terms

326. 4 factors

327. A. Just as the distributive law says that $x(3+6)$ is $3x + 6x$, it says the reverse, that $3x + 6x = (3+6)x$.

328. 17

Chapter 21: Solving Inequalities

329. If you multiply or divide by a negative number, you reverse the direction of the inequality. For example, $2 < 4$. If we multiply both sides by -1 , we get $-2 > -4$, which is correct, not $-2 < -4$, which is incorrect.

330. B, a set of numbers. For example, the set of all numbers greater than 5.

$$331. x+2>7$$

$$x>5$$

So the answer to this inequality is the set of all numbers greater than 5. There are an infinite number of correct answers: 6, 21, 5.1, 478, and so on.

$$332. 4x + 3 > 23$$

$$4x > 20$$

$$x > 5$$

So the same set as the previous question!

$$333. -x < 20$$

multiplying both sides by -1 , we get

$$x > 20.$$

$$334. 3 - 2x > 19$$

$$-2x > 16$$

$$x < -8$$

So the set of all x where $x < -8$.

$$335. 5 - 1/x > 10$$

$$-1/x > 5$$

Assume x is positive. $-1/x > 5$

$$-1 > 5x$$

$$5x < -1$$

$$x < -1/5$$

So when we assume x is positive, we get a set consisting of only negative numbers. So that doesn't get us any answers that work.

Assume x is negative. $-1/x > 5$

$-1 < 5x$ (we reversed the direction because of multiplying both sides by neg.)

$$5x > -1$$

$$x > -1/5$$

So the set of numbers greater than $-1/5$ and less than 0 should work.

Let's try $-1/10$ in the original inequality.

$$5 - 1/(1/-10) > ? 10$$

$$5 - (-10) > ? 10$$

$$5 + 10 > 10 \text{ it works!}$$

$$336. 4/x \leq 1$$

Assume x is positive.

$$4 \leq x$$

or

$$x \geq 4$$

Now assume x is negative.

$$4/x \leq 1$$

$$4 \geq x$$

$$x \leq 4$$

So the set of numbers that are either greater than or equal to 4, OR any negative numbers (since they are all less than 4).

Let's see if it works with -2.

$$4/-2 \leq ? 1$$

$$-2 \leq 1 \text{ it works!}$$

Let's see if it works with 5.

$$4/5 \leq 1 \text{ Yep, that works also!}$$

Chapter 22: Means and Medians

337. The mean

338. You add up all the numbers in the set. You divide by how many numbers there are.

$$339. 70 * 10 = 700$$

Since the mean = total / N of numbers, total = mean * N of numbers

$$340. \text{ The total is } 5 * 4 = 20$$

$$\text{The new total is } 6 * 5 = 30$$

The total increased from 20 to 30 when one number was included in the group. So that number must have been $30 - 20$ or 10.

341. The median

342. 3

343. 3

344. A. The median (The median is 40.5 seconds, and his is pretty close to what 3 out of the 4 runners ran.)

B. The mean (The mean depends on the total amount of time for the relay race, (in this case it's the total / 4) and that's the relevant number for winning.)

345. The 75th percentile.

346. The 50th percentile.

347. Income, for most people.

348. Probably being in the 50th percentile for the peaceful village, you'd be happier than more than 90% of prisoners.

Chapter 23: The Fundamental Counting Principle

349. $3 * 2 = 6$ possible orders.

350. First person, 3 ways. Second person, 2 ways. Third person, 1 way. So 6 ways they can line up.

351. 9 ways to pick a president. After that, 8 ways to pick a vice pres. After that, 7 ways to pick a secretary, and after that, 6 ways to pick a treasurer.

So $9*8*7*6$ ways to pick, altogether, or 3,024 ways.

352. The second person is right.

353. Both reasoned correctly, and both got the right answer.

354. Yes.

355. $6*5*4*3*2*1$ or 720 different permutations.

356. A

357. Because the numbers that open a lock must be ordered in the correct order to open the lock. However, if you can have the numbers repeat, you don't reduce the factor by 1 each time. So if there are 3 numbers chosen from 0 to 40, (41 choices for each of the 3), if the lock lets you repeat, the number possible is $41*41*41$. On the other hand, if there are no repeats, the number of possible opening sets is $41*40*39$.

Chapter 24: Probability

358. $4/21$

359. $17/21$ Which is $(21-4)/21$

360. Wrong. There are 11 chips altogether, so the probability of picking a red chip is $4/11$. (There is something called the odds, and the odds of picking a red chip are $4/7$! Probability and odds are two different things.)

361. red: $4/17$ blue: $7/17$ red or blue: $11/17$. (There are 11 chips that are red or blue.)

Yes, the probability of red or blue is the sum of the probabilities for red and blue.

In this problem picking red and blue are mutually exclusive: if you pick one, you can't at the same time have picked the other.

362. The conditional probability. A reason for slowing down is that the conditional probability of bad outcomes is greater at 90 than at 55.

363. B, usually.

364. $1/2$ multiplied together 5 times, or $1/32$.

Probability of at least one head is $31/32$.

365. Mutually exclusive. You can only roll 1 number.

366. Independent. What happens on roll #1 doesn't affect roll #2.

367. $2/6$, or $1/3$.

368. $1/6 * 1/6$, or $1/36$.

369. B

Chapter 25: Exponents

370. 5 times 2 more 5s, for a total of 3 5s multiplied together.

371. A

372. 2^{16} . In computer programs this is usually written 2^{**16} or $2^{\wedge 16}$.

373. 2^{**6} (Easier to write than using superscripts)

374. \$18,420 dollars! ($1000 * 1.06^{**50}$)

375. 7^{**3} 7^{**3} Illustrates that multiplying by a number with a negative exponent is the same as dividing by the number with a positive exponent.

376. 5. 1.

377. $4 * 10^{**4}$, sometimes written 4E4

378. 4×10^{-4} , sometimes written 4E-4

379. 2.15×10^{-3} or 2.15E-3

380. 6.2×10^7 , or 6.2E7

381. 43,000

382. 6E11

383. 2^6

384. 2^{35}

385. True

386. True

387. p^5/q^5

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

388. perpendicular

389. parallel

390. $A=LW$ where A =Area, L =length, W =Width

391. 90 degrees

392. 180 degrees

393. No, not unless the parallelogram is also a rectangle. The formula for area of a parallelogram is base times height, not the product of the lengths of the sides.

394. Yes.

395. 25 square meters, or one-half the base times the height.

396. 25 square meters for the area.

397. The ratio of the circumference to the diameter.

398. 1 meter

399. Radius = 5 therefore diameter=10, circumference = 10π , or about 31.4 meters.

400. $C = 2\pi \times R$

401. The length is πR , i.e. half the circumference. The width is R .

402. A. for rectangle, $A=LW$ where A =area, L =length, W =width

B. for parallelogram, $A=BH$ where A =area, B =length of base, H =height

C. for triangle, $A=1/2BH$, where A =area, B =length of base, H =height

D. for trapezoid, $A=1/2H(L_1+L_2)$ where A =Area, H =Height, L_1 and L_2 are the lengths of the parallel sides

E. for circle, $A=\pi R^2$, where A =area, R =radius of the circle

Chapter 27: Roots and Fractional Exponents

403. The number when multiplied by itself, or raised to the 2nd power, (or squared) gives x .

404. The number which when raised to the n th power, gives x .

405. A fraction like $1/3$. When squared, it's $1/9$. Any fraction between 0 and 1 fits this property.

406. A rational number can be expressed as the ratio of 2 whole numbers. It can be expressed as a repeating decimal. An irrational number can't be expressed in either of those ways.

407. Yes.

408. Not a real number, yes it's an imaginary number.

409. You get $x^{n/n}$ or x^1 or x itself.

410. $a^{1/b}$ is the b th root of a .

411. It's the cube root of 27, squared, or 9.

412. True.

413. False.

414. True.

415. True.

Chapter 28: The Cartesian Coordinate System

416. The original

417. Start at the origin and walk along the abscissa (the x -axis) in the positive direction for 5 units. Then take a left turn and go perpendicular to the x -axis for 1 unit. Then stop, and you're there.

To get to $-5, -1$, you start at the origin, go 5 units in the negative direction, again turn 90 degrees to you left, go one more unit, and stop.

418. Quadrant 2: x negative, y positive

Quadrant 3: x negative, y negative

Quadrant 4: x positive, y negative

419. Rise is 3- -1 or 4. Run is 3 - -2, or 5. Slope, or rise/run, is $\frac{4}{5}$.

420. Rise is -3, run is -2. Slope is $\frac{3}{2}$.

421. Points. Good idea because you know exactly where a point is, whereas for a square there are lots of places (an infinite number, really) inside the square.

422. slope = $(y_2 - y_1) / (x_2 - x_1)$

423. Toward the right.

Chapter 29: Using the Cartesian coordinate system to make pictures of functions

424. $12 = ? 3 \cdot 6 + 2$

$12 = ? 18 + 2$ No, the point 6,12 does not obey this rule.

425. $12 = ? 3 \cdot 6 - 6$

$12 = 18 - 6$ Yes, the point 6,12 does obey this rule.

426. $y = 5 \cdot 7 - 10$

$y = 35 - 10$

$y = 25$

427. True

428. The value of y when x is 0. Or the ordinate of the point where the line crosses the y axis.

429. For $y = 5x + 2$, slope = 5, y-intercept = 2

430. For $y = mx + b$, slope = m, y-intercept = b

431. Yes, they were correct.

432. $13 = 5 \cdot 2 + b$

$3 = b$

So the equation is $y = 5x + 3$.

433. Slope is $(13 - 7) / (4 - 2)$ or $\frac{6}{2}$ or 3.

Using the point 2,7: $7 = 3 \cdot 2 + b$

$1 = b$

So equation is $y = 3x + 1$

434. $10x + 5y = 1$

$5y = -10x + 1$

$y = -2x + \frac{1}{5}$

slope=-2, y-intercept=1/5

435. A straight line

436. A parabola

Chapter 30: The Pythagorean Theorem

437. A right triangle, i.e. one with a right angle.

438. $c^2 = a^2 + b^2$, where c is the length of the hypotenuse, and a and b are the lengths of the other two sides.

439. $10^2 = 8^2 + x^2$

$$100 = 64 + x^2$$

$$x^2 = 36$$

$$x = 6$$

440. the square root of 1^2 plus 1^2 , or the square root of 2.

441. the square root of 3^2 plus 4^2 , or the square root of 25, or 5.

442. The distributive law.

443. firsts, insides, outsides, lasts

444. $(2x+1)(3x+2)$

$$6x^2 + 4x + 3x + 2$$

$$6x^2 + 7x + 2$$

445. $(3x-3)(2x-1)$

$$6x^2 - 3x - 6x + 3$$

$$6x^2 - 9x + 3$$

Chapter 32: Some words used in logic

446. No one lives forever.

447. Some males do not have a y chromosome.

448. Converse: If someone is a US citizen, that person is president of the US.

Inverse: If someone is not president of the US, that person is not a US citizen.

Contrapositive: If someone is not a US citizen, that person is not president of the US.

449. Converse: If you get more skilled at math, you will enjoy it.

Inverse: If you do not enjoy math, you have not gotten more skilled at it.

Contrapositive: If you have not gotten more skilled at math, you have not enjoyed math.

