188. c. If the cost of the pants is reduced by 8%, the cost of the pants is 92% of the original cost (100% − 8% = 92%). To ﬁnd 92% of the original cost, multiply the original cost of the pants by the decimal equivalent of 92%; $24 × 0.92 = $22.08.

189. c. If the number of points is increased by 20%, the number of points in his senior year is 120% of the number of points in his junior year (100% + 20% = 120%). To ﬁnd 120% of the number of points in his junior year, multiply the junior year points by the decimal equivalent of 120%; 260 × 1.20 = 312. If you chose a, you calculated what his points would be if he scored 20% LESS than he did in his junior year.

190. d.First, ﬁnd the total of Brian’s sales; $153,000 + $299,000 + $121,000 = $573,000. To ﬁnd 2.5% of $573,000, multiply by the decimal equivalent of 2.5%; $573,000 × 0.025 = $14,325. If you chose a, you used the decimal 0.25, which is 25%, NOT 2.5%.

191. c. Use a proportion to ﬁnd the original cost of the frying pan; w p h a o r l t e = 1 % 00 . The $3.75 that was saved is part of the original price. The whole price is what we are looking for, so call it x. The % is 30 (the percent off); 3. x 75 = 1 3 0 0 0 . To solve the proportion, cross-multiply. (3.75)(100) = 30x. Divide both sides by 30 to solve for x; 3 3 7 0 5 = 3 3 0 0 x ; x= $12.50.

192. b.First, you must ﬁnd how many baseball cards Peter had originally. Use a proportion to ﬁnd the original number of baseball cards; w p h a o r l t e = 1 % 00 . The 14 baseball cards that he added to his collection is the part. The whole number of baseball cards is what we are looking for, so call it x. The % is 35 (the percent of increase); 1 x 4 = 1 3 0 5 0 . To solve the proportion, cross-multiply; (14)(100) = 35x. Divide both sides by 35 to solve for x; 1, 3 4 5 00 = 3 3 5 5 x ; x= 40. The original number of baseball cards was 40, and 14 more were added to the collection for a total of 54 cards.

193. b.To ﬁnd 70% of 30, you must multiply 30 by the decimal equivalent of 70% (0.70); 30 × 0.70 = 21. If you chose c, you calculated how many pages he has left to read after his break.

194. c. Find 20% of $500 by multiplying $500 by the decimal equivalent of 20% (0.20); $500 × 0.20 = $100. She spent $100 on clothes, leaving her with $400. Find 25% of $400; 0.25 × 400 = $100. Julie spent $100 on CDs. $100 on clothes plus $100 on CDs totals $200 spent. If you chose a, you found 45% (20% + 25%) of the total without taking into account that the 25% was on the amount of money Julie had AFTER spending the original 20%.

195. c. Since 5% sales tax was added to the cost of the coat, $68.25 is 105% of the original price of the coat. Use a proportion to ﬁnd the original cost of the coat; w p h a o r l t e = 1 % 00 . Part is the price of the coat with the sales tax, $68.25. Whole is the original price on the coat that we are looking for. Call it x. The % is 105; 68 x .25 = 1 1 0 0 5 0 . To solve for x, cross-multiply; (68.25)(100) = 105x. Divide both sides by 105; 6 1 ,8 0 2 5 5 = 1 1 0 0 5 5 x ; x = $65.00.

196. c. The Dow lost 2%, so it is worth 98% of what it was worth at the beginning of the day (100% − 2% = 98%). To ﬁnd 98% of 8,800, multiply 8,800 by the decimal equivalent of 98%; 8,800 × 0.98 = 8,624.

197. c. First, ﬁnd the number of residents who left Hamden by subtracting the new population from the old population; 350,000 − 329,000 = 21,000. The population decreased by 21,000. To ﬁnd what percent this is of the original population, divide 21,000 by the original population of 350,000; 21,000 ÷ 350,000 = 0.06; 0.06 is equivalent to 6%. If you chose d, you found the decrease in relation to the NEW population (2000) when the decrease must be in relation to the original population (1990).

198. c. Find 6% of $10.50 by multiplying $10.50 by 0.06 (the decimal equivalent of 6%); $10.50 × 0.06 = $0.63. If you chose b, you found 60% (0.6) instead of 6% (0.06).

199. b.Divide $6 by $16 to ﬁnd the percent; $6 ÷ $16 = 0.375; 0.375 is equivalent to 37.5%.

200. b.To ﬁnd 7% of $5,250, multiply $5,250 by the decimal equivalent of 7% (0.07); $5,250 × 0.07 = $367.50.

201. b.To ﬁnd 16% of $3,650, multiply $3,650 by the decimal equivalent of 16% (0.16); $3,650 × 0.16 = $584.

202. d.Since Rebecca is 12.5% taller than Debbie, she is 112.5% of Debbie’s height (100% + 12.5% = 112.5%). To ﬁnd 112.5% of Debbie’s height, multiply Debbie’s height by the decimal equivalent of 112.5% (1.125); 64 × 1.125 = 72 inches. If you chose c, you found what Rebecca’s height would be if she were 12.5% SHORTER than Debbie (you subtracted instead of added).

203. a. Use the proportion w p h a o r l t e = 1 % 00 to solve the problem; $1,325 is the part and 5% is the %. We are looking for the whole so we will call it x; 1,3 x 25 = 1 5 00 . Cross multiply; (1,325)(100) = 5x. Divide both sides by 5 to solve for x; 132 5 ,500 = 5 5 x ; x = $26,500. If you chose b, you found 5% of her commission (5% of $1,325).

204. a. Find the number of dollars off. $260 − $208 = $52. Next, determine what percent of the original price $52 is by dividing $52 by the original price, $260; $52 ÷ $260 = 0.20; 0.20 is equivalent to 20%.

205. a. Determine the number of T-shirts sold; 80 − 12 = 68. To ﬁnd what percent of the original number of shirts 68 is, divide 68 by 80; 68 ÷ 80 = 0.85; 0.85 is equivalent to 85%. If you chose b, you found the percent of T-shirts that were LEFT instead of the percent that had been SOLD.

206. a. The printer is 20% off. That means that it is 80% of its original price (100% − 20% = 80%). To ﬁnd 80% of $190, multiply $190 by the decimal equivalent of 80% (0.80); $190 × 0.80 = $152.

207. b.To ﬁnd 19% of 26, multiply 26 by the decimal equivalent of 19% (0.19); 26 × 0.19 = 4.94.

208. a. Use the proportion w p h a o r l t e = 1 % 00 . Part is the number of female teachers (81). Whole is what we are looking for; call it x; the % is 45; 8 x 1 = 1 4 0 5 0 . Cross multiply; (81)(100) = 45x. Divide both sides by 45 to solve for x; 8, 4 1 5 00 = 4 4 5 5 x ; x = 180.

209. d.Kim sold over $20,000 in May. She received a 5% commission on the ﬁrst $20,000 of sales. To ﬁnd 5%, multiply by the decimal equivalent of 5% (0.05); $20,000 × 0.05 = $1,000. Since her total commission was $3,975, $3,975 − $1,000 = $2,975 is the amount of commission she earned on her sales over $20,000. $2,975 is 8.5% of her sales over $20,000. To ﬁnd the amount of her sales over $20,000, use a proportion; w p h a o r l t e = 1 % 00 . Part is $2,975, and whole is what we are looking for, so let’s call it x. The % is 8.5; 2,9 x 75 = 1 8 0 .5 0 . To solve for x, cross multiply; (2,975)(100) = 8.5x. Divide both sides by 8.5 to solve; 297 8 , . 5 5 00 = 8 8 . . 5 5 x ; x = $35,000. Her sales over $20,000 were $35,000. Her total sales were $55,000 ($20,000 + $35,000).

210. d.To ﬁnd 64% of 75, multiply 75 by the decimal equivalent of 64% (0.64); 75 × 0.64 = 48. If you chose c, you found the number of girls.

211. d.First, ﬁnd the sale price of the scarf and the gloves. They are both 20% off, which means that Christie paid 80% of the original price (100% − 20% = 80%). To ﬁnd 80% of each price, multiply the price by the decimal equivalent of 80% (0.80); $15.50 × 0.80 = $12.40. $5.50 × 0.80 = $4.40. Together the two items cost $16.80 ($12.40 + $4.40 = $16.80). There is 5% sales tax on the total price. To ﬁnd 5% of $16.80, multiply $16.80 by the decimal equivalent of 5% (0.05); $16.80 × 0.05 = $0.84. The tax is $0.84. Christie paid a total of $17.64 ($16.80 + $0.84 = $17.64).

212. b.To ﬁnd 107% of $54, multiply $54 by the decimal equivalent of 107% (1.07); $54 × 1.07 = $57.78. If you chose d, you found what the cost of the book would be if it was 7% LESS next year.

213. a. If Larry earns a 31 4 % (or 3.25%) raise, he will earn 103.25% of his original salary. To ﬁnd 103.35% of $32,000, multiply $32,000 by the decimal equivalent of 103.25% (1.0325); $32,000 × 1.0325 = $33,040. If you chose d, you found his salary with a 3% raise when multiplying by 1.03 or 0.03 and then adding that answer to his original salary.

214. a. Work backwards to ﬁnd the answer. After lunch Bill had $6. He had spent 50% (or 1 2 ) of what he had on lunch and 50% is what is left. Since $6 is 50% of what he had before lunch, he had $12 before lunch. Using the same reasoning, $12 is 50% of what he had before buying school supplies. Therefore, he had $24 when he began shopping.

215. d.If a coat is marked up 22%, it is 122% of its original cost (100% + 22% = 122%). To ﬁnd 122% of the original cost, multiply $72 by the decimal equivalent of 122% (1.22); $72 × 1.22 = $87.84.

216. d.Kristen has a total of 17% taken out of her check. Therefore, she is left with 83% of what she started with (100% − 17% = 83%). To ﬁnd 83% of $550, multiply $550 by the decimal equivalent of 83%; $550 × 0.83 = $456.50.501

217. d.Coastal Cable gained a total of 360,000 customers (1,800,000 − 1,440,000 = 360,000). To ﬁnd out what percent of the original number of customers 360,000 represents, divide 360,000 by 1,440,000; 360,000 ÷ 1,440,000 = 0.25; 0.25 is equivalent to 25%. If you chose c, you found the percent of increase in relation to the new number of customers (1,800,000) rather than the original number of customers (1,440,000).

218. a. The price of heating oil rose $0.33 ($1.43 − $1.10 = $0.33). To ﬁnd the percent of increase, divide $0.33 by the original cost of $1.10; $0.33 ÷ $1.10 = 0.3; 0.3 is equivalent to 30%. If you chose c, you found the percent of increase in relation to the new price ($1.43) rather than the original price ($1.10).

219. b.The percents must add to 100%; 24% + 13% + 41% = 78%. If 78% of the girls surveyed have been accounted for, the remainder of the girls must have said that ﬁeld hockey is their favorite sport. To ﬁnd the percent that said ﬁeld hockey is their favorite sport, subtract 78% from 100%; 100% − 78% = 22%; 22% of the girls said that ﬁeld hockey is their favorite sport.

220. c. 78% weigh less than 8.5 pounds, but you must subtract the 25% that are below 6 pounds; 78% − 25% = 53%. 53% of the babies weigh between 6 and 8.5 pounds.

221. d.Find 20% of the original price of the coat and subtract it from the original price. To ﬁnd 20%, multiply by 0.20; $80 × 0.20 = $16. Take $16 off the original price; $80 − $16 = $64. The ﬁrst sale price is $64. Take 15% off this using the same method; $64 × 0.15 = $9.60; $64 − $9.60 = $54.40. The new price of the coat is $54.40. Another way of solving this problem is to look at the percent that is left after the discount has been taken. For example, if 20% is taken off, 80% is left (100% − 20%). Therefore, 80% of the original price is $80 × 0.80 = $64. If 15% is taken off this price, 85% is left; $64 × 0.85 = $54.40. This method eliminates the extra step of subtracting.

222. a. Change the fraction to a decimal by dividing the numerator by the denominator (top ÷ bottom); 3 ÷ 5 = 0.6. Change 0.6 to a percent by multiplying by 100; 0.6 × 100 = 60%. Recall that multiplying by 100 means that the decimal point is moved two places to the right.

223. d.Find 15% of 700 by multiplying 700 by the decimal equivalent of 15% (0.15); 700 × 0.15 = 105; 105 people said that red is their favorite color. Another way of looking at this problem is to recall that 15% means “15 out of 100.” Since 700 is 7 times 100, multiply 15 by 7 to ﬁnd the number of people out of 700 who said red was their favorite color; 15 × 7 = 105.

224. a. Write the relationship as a fraction; w p h a o r l t e or w t a o l t k a e l rs = 2 8 0 . Find the decimal equivalent by dividing the numerator by the denominator (top ÷ bottom); 8 ÷ 20 = 0.4. Change 0.4 to a percent by multiplying by 100; 0.4 × 100 = 40%. Recall that multiplying by 100 means that the decimal point is moved two places to the right. Another way to look at this problem is using a proportion; w p h a o r l t e = 1 % 00 . You are looking for the percent, so that will be the variable; 2 8 0 = 10 x 0 . To solve the proportion, cross-multiply and set the answers equal to each other; (8)(100) = 20x. Solve for x by dividing both sides by 20. 800 = 20x 8 2 0 0 0 = 2 2 0 0 x x = 40 40% of the students are walkers.

225. d.First, ﬁnd the number of walkers and then ﬁnd one third of that number. Find 37.5% of 24 by multiplying 24 by the decimal equivalent of 37.5%. To ﬁnd the decimal equivalent, move the decimal point two places to the left; 37.5% = 0.375. Now, multiply 24 × 0.375 = 9. Find one third of 9 by dividing 9 by 3; 9 ÷ 3 = 3. Three walkers got rides.

226. c. Find the price of the two items together (without tax); $45 + $55 = $100. Next, ﬁnd 6% of $100. You can multiply $100 by 0.06, but it is easier to realize that 6% means “6 out of 100,” so 6% of $100 is $6. The sales tax is $6. A common mistake is to use 0.6 for 6% instead of 0.06; 0.6 is 60%. To ﬁnd the decimal equivalent of a percent, you must move the decimal point two places to the left.

227. a. A proportion can be used to solve this problem; w p h a o r l t e = 1 % 00 . In this example, the part is the tax, the % is 8, and the whole is x. To solve the proportion, cross-multiply, set the cross-products equal to each other, and solve as shown below. 2. x 12 = 1 8 00 (2.12)(100) = 8x 212 = 8x 21 8 2 = 8 8 x x = 26.5 The price of the book is $26.50.

228. c. Find 20% by multiplying $65 by the decimal equivalent of 20% (0.20); $65 × 0.20 = $13.00. The tip is $13. Another method for solving this problem is to ﬁnd 10% of $65.00 by dividing $65.00 by 10 (which means moving the decimal point one place to the left); $65.00 ÷ 10 = $6.50. Once you have 10%, just double it to ﬁnd 20%; $6.50 × 2 = $13.00.

229. a. Find 54% of 23,500 by multiplying 23,500 by the decimal equivalent of 54% (0.54); 23,500 × 0.54 = 12,690; 12,690 people are expected to vote for Mr. Salva.

230. c. The original price of the bike is 100%. If the sale takes 30% off the price, it will leave 70% of the original price (100% − 30% = 70%).

231. b.Find 12.5% of $10 and subtract it from $10. Find 12.5% of $10 by multiplying $10 by the decimal equivalent of 12.5% (0.125); $10 × 0.125 = $1.25; $1.25 is taken off the price of the mittens. Subtract $1.25 from $10 to ﬁnd the sale price; $10 − $1.25 = $8.75. The sale price is $8.75. Another way to compute the sale price is to ﬁnd what percent is left after taking the discount. The original price was 100% and 12.5% is taken off; 87.5% is left (100% − 12.5% = 87.5%). Find 87.5% of the original cost by multiplying $10 by the decimal equivalent of 87.5% (0.875); $10 × 0.875 = $8.75.

232. a. Use a proportion to solve the problem; w p h a o r l t e = 1 % 00 . The whole is $1,500 and the part is $525. You are looking for the %, so it is x. To solve the proportion, cross-multiply, set the cross-products equal to each other, and solve as shown below. 1 5 ,5 2 0 5 0 = 10 x 0 (1,500)x = (525)(100) 1,500x = 52,500 1 1 , , 5 5 0 0 0 0 x = 5 1 2 ,5 ,5 0 0 0 0 x = 35% They have raised 35% of the goal. Another way to ﬁnd the percent is to divide the part by the whole, which gives you a decimal. Convert the decimal into a percent by multiplying by 100 (move the decimal point two places to the right); 1 5 ,5 2 0 5 0 = 0.35 = 35%.

233. c. Find 32% of $5,000 by multiplying $5,000 by the decimal equivalent of 32% (0.32); $5,000 × 0.32 = $1,600.

234. a. Divide the part by the whole; 1,152 ÷ 3,600 = 0.32. Change the decimal to a percent by multiplying by 100 (move the decimal point two places to the right); 32% of the people surveyed said that they work more than 40 hours a week. Another way to ﬁnd the answer is to use a proportion; w p h a o r l t e = 1 % 00 . The part is 1,152, the whole is 3,600, and the % is x. To solve the proportion, cross-multiply, set the cross-products equal to each other, and solve as shown below. x = 32

235. b.Find 15% of 60 inches and add it to 60 inches. Find 15% by multiplying 60 by the decimal equivalent of 15% (0.15); 60 × 0.15 = 9. Add 9 inches to 60 inches to get 69 inches.

236. c. Call the original price of the jeans x. First 20% is deducted from the original cost (the original cost is 100%); 80% of the original cost is left (100% − 20% = 80%); 80% of x is 0.80x. The cost of the jeans after the ﬁrst discount is 0.80x. This price is then discounted 15%. Remember 15% is taken off the discounted price; 85% of the discounted price is left. Multiply the discounted price by 0.85 to ﬁnd the price of the jeans after the second discount; (0.85)(0.80x) is the cost of the jeans after both discounts. We are told that this price is $17. Set the two expressions for the cost of the jeans equal to each other (0.85)(0.80x) = $17 and solve for x (the original cost of the jeans). (0.85)(0.80x) = 17 0.68x = 17 0 0 . . 6 6 8 8 x = 0 1 .6 7 8 x = 25 The original price of the jeans was $25.

237. a. Use a proportion to solve the problem; w p h a o r l t e = 1 % 00 . The whole is the price of the basket (which is unknown, so call it x), the part is the tax of $0.70, and the % is 5. The proportion is 0. x 70 = 1 5 00 . Solve the proportion by cross-multiplying, setting the cross-products equal to each other, and solving as shown below. 0. x 70 = 1 5 00 (100)(0.70) = 5x 70 = 5x 7 5 0 = 5 5 x x = 14 The price of the basket was $14.

238. c. Break the rectangle into eighths as shown below. The shaded part is 6 8 or 3 4 ; 3 4 is 75%.86

239. a. To ﬁnd 20%, add 5% to 15%. Since 15% is known to be $42, 5% can be found by dividing $42 by 3 (15% ÷ 3 = 5%); $42 ÷ 3 = $14. To ﬁnd 20%, add the 5% ($14) to the 15% ($42); $14 + $42 = $56; 20% is $56.

240. d.Use a proportion to solve the problem; w p h a o r l t e = 1 % 00 . The part is $100,000, the whole is $130,000, and the % is x because it is unknown; 1 1 0 3 0 0 , , 0 0 0 0 0 0 = 10 x 0 . To solve the proportion, cross-multiply, set the cross-products equal to each other, and solve as shown below. 10 1 , 3 0 0 0 , 0 0 , 0 0 0 00 = 1 1 3 3 0 0 , , 0 0 0 0 0 0 x x = 77 77% of the budget has been spent.

241. b.Multiply $359,000 by the decimal equivalent of 1.5% (0.015) to ﬁnd her commission; $359,000 × 0.015 = $5,385; $5,385 is the commission. A common mistake is to use 0.15 for the decimal equivalent of 1.5%; 0.15 is equivalent to 15%. Remember, to ﬁnd the decimal equivalent of a percent, move the decimal point two places to the left.

242. d.To ﬁnd the price he sells it for, add the mark-up to his cost ($35). The mark-up is 110%. To ﬁnd 110% of his cost, multiply by the decimal equivalent of 110% (1.10); $35 × 1.10 = $38.50. The mark-up is $38.50. Add the mark-up to his cost to ﬁnd the price the vase sells for; $38.50 + $35.00 = $73.50.

243. c. Use a proportion to solve the problem; w p h a o r l t e = 1 % 00 . The part is $125,000 (the part Michelle owns), the whole is $400,000 (the whole value of the house), and the % is x because it is unknown. 0 To solve the proportion, cross-multiply, set the cross-products equal to each other, and solve as shown below. 1 4 2 0 5 0 , ,

244. d.Find the Social Security tax and the State Disability Insurance, and then subtract the answers from Kyra’s weekly wages. To ﬁnd 7.51% of $895, multiply by the decimal equivalent of 7.51% (0.0751); $895 × 0.0751 = $67.21 (rounded to the nearest cent). Next, ﬁnd 1.2% of her wages by multiplying by the decimal equivalent of 1.2% (0.012); $895 × 0.012 = $10.74. Subtract $67.21 and $10.74 from Kyra’s weekly wages of $895 to ﬁnd her weekly paycheck; $895 − $67.21 − $10.74 = $817.05. Her weekly paycheck is $817.05.

245. a. Find 5% of the bill by multiplying by the decimal equivalent of 5% (0.05); $178 × 0.05 = $8.90. They will save $8.90. A common mistake is to use 0.5 instead of 0.05 for 5%; 0.5 is 50%.

246. d.Find 30% of 1,800 by multiplying by the decimal equivalent of 30% (0.30); 1,800 × 0.30 = 540. The maximum number of calories from fats per day is 540.

247. c. Find 24% of $1,345 by multiplying by the decimal equivalent of 24% (0.24); $1,345 × 0.24 = $322.80. $322.80 can be deducted.

248. b.Use the proportion w p h a o r l t e = 1 % 00 . You are looking for the whole (100% is the whole capacity of the plant). The part you know is 450 and it is 90% of the whole; 45 x 0 = 1 9 0 0 0 . To solve the proportion, cross multiply, set the cross-products equal to each other, and solve as shown below. (450)(100) = 90x 45,000 = 90x 45 9 ,0 0 00 = 9 9 0 0 x x = 500 100% capacity is 500 cars. Another way to look at the problem is to ﬁnd 10% and multiply it by 10 to get 100%. Given 90%, divide by 9 to ﬁnd 10%; 450 ÷ 9 = 50. Multiply 10% (50) by 10 to ﬁnd 100%; 50 × 10 = 500.

249. b.Multiply by the decimal equivalent of 1 2 % (0.005) to ﬁnd the amount of increase; $152,850 × 0.005 = $764.25. This is how much sales increased. To ﬁnd the actual amount of sales, add the increase to last month’s total; $152,850 + $764.25 = $153,614.25. A common mistake is to use 0.5 (50%) or 0.05 (5%) for 1 2 %. Rewrite 1 2 % as 0.5%. To ﬁnd the decimal equivalent, move the decimal point two places to the left. This yields 0.005.

250. c. Find 5% of 230 by multiplying 230 by the decimal equivalent of 5% (0.05); 230 × 0.05 = 11.5 people. Since you cannot have .5 of a person, round up to 12 people. A common mistake is to use 0.5 for 5%; 0.5 is actually 50%.