

Reasoning

Subtest 2: Arithmetic Reasoning

Time: 36 minutes for 30 questions

Directions: This test contains questions about arithmetic. Each question is followed by four possible answers. Decide which answer is correct and then mark the space on your answer sheet that has the same number and letter as your choice. Use scratch paper for any figuring you want to do. A calculator is not allowed.

1. If a car is towed 12 miles to the repair shop and the tow charge is \$3.50 per mile, how much does the tow cost?
(A) \$12.00
(B) \$3.50
(C) \$42.00
(D) \$100.00
2. The sum of two numbers is 70. One number is 8 more than the other. What's the smaller number?
(A) 31
(B) 33
(C) 35
(D) 36
3. A sales manager buys antacid in bottles by the gross. If he goes through 3 bottles of antacid every day, how long will the gross last?
(A) 144 days
(B) 3 days
(C) 20 days
(D) 48 days
4. Jenny's test grades are 93, 89, 96, and 98. If she wishes to raise her average to 95, what does she need to score on her next test?
(A) 100
(B) 99
(C) 97
(D) 95
5. A waitress earns an average tip of 12% of the cost of the food she serves. If she serves \$375 worth of food in one evening, how much money in tips will she earn on average?
(A) \$37
(B) \$45
(C) \$42
(D) \$420
6. How many square feet of carpeting are needed to carpet a 12-foot x 12-foot room?
(A) 24
(B) 120
(C) 48
(D) 144
7. Carpet stain protector costs \$0.65 per square yard to apply. How much will it cost to apply the protector to a 16-foot x 18-foot carpet?
(A) \$187.20
(B) \$62.40
(C) \$20.80
(D) \$96.00
8. A printing plant that produces baseball cards has a monthly overhead of \$6,000. It costs 18 cents to print each card, and the cards sell for 30 cents each. How many cards must the printing plant sell each month in order to make a profit?
(A) 30,000
(B) 40,000
(C) 50,000
(D) 60,000

Reasoning

9. Joe received an hourly wage of \$8.15. His boss gave him a 7% raise. How much does Joe make per hour now?
- (A) \$0.57
(B) \$8.90
(C) \$8.72
(D) \$13.85
10. Alice leaves her house, driving east at 45 miles per hour (mph). Thirty minutes later, her husband Dave notices she forgot her cell phone and sets off after her. How fast must Dave travel in order to catch up with Alice 3 hours after he leaves?
- (A) 49 mph
(B) 50.5 mph
(C) 52.5 mph
(D) 54 mph
11. A baker made 20 pies. A Boy Scout troop buys one-fourth of his pies, a preschool teacher buys one-third of his pies, and a caterer buys one-sixth of his pies. How many pies does the baker have left?
- (A) $\frac{3}{4}$
(B) 15
(C) 12
(D) 5
12. Miriam bought five cases of motor oil on sale. A case of motor oil normally costs \$24.00, but she was able to purchase the oil for \$22.50 a case. How much money did Miriam save on her entire purchase?
- (A) \$7.50
(B) \$1.50
(C) \$8.00
(D) \$22.50
13. A security guard walks the equivalent of six city blocks when he makes a circuit around the building. If he walks at a pace of eight city blocks every 30 minutes, how long will it take him to complete a circuit around the building, assuming he doesn't run into any thieves?
- (A) 20.00 minutes
(B) 3.75 minutes
(C) 22.50 minutes
(D) 7.5 minutes
14. The population of Grand Island, Nebraska, grew by 600,000 people between 1995 and 2005, one-fifth more than the town council predicted. The town council originally predicted the city's population would grow by
- (A) 400,000
(B) 500,000
(C) 300,000
(D) 100,000
15. Joan is taking an admissions examination. If she has to get at least 40 of the 60 questions right to pass, what percent of the questions does she need to answer correctly?
- (A) 30%
(B) 40%
(C) $66\frac{1}{3}\%$
(D) $66\frac{2}{3}\%$
16. A teacher deposits \$3,000 in a retirement fund. If she doesn't add any more money to the fund, which earns an annual interest rate of 6%, how much money will she have in 1 year?
- (A) \$180
(B) \$3,006
(C) \$3,180
(D) \$6,000
17. The high school track measures one-quarter of a mile around. How many laps would you have to run in order to run three and a half miles?
- (A) 12
(B) 14
(C) 16
(D) 18
18. Karl is driving in Austria, where the speed limit is posted in kilometers per hour. The car's speedometer shows that he's traveling at a rate of 75 kilometers per hour. Karl knows that a kilometer is about $\frac{5}{8}$ of a mile. Approximately how many miles per hour is Karl traveling?
- (A) 47
(B) 120
(C) 50
(D) 53

Reasoning

19. A carpenter earns \$12.30 an hour for a 40-hour week. His overtime pay is $1\frac{1}{2}$ times his base pay. If he puts in a 46-hour week, how much is his weekly pay?
- (A) \$602.70
(B) \$492.00
(C) \$565.80
(D) \$110.70
20. An office building has 30 employees and provides 42 square feet of work space per employee. If five more employees are hired, how much less work space will each employee have?
- (A) 6 square feet
(B) 7 square feet
(C) 7.5 square feet
(D) 36 square feet
21. Stan bought a monster truck for \$2,000 down and payments of \$450 a month for five years. What's the total cost of the monster truck?
- (A) \$4,250
(B) \$29,000
(C) \$27,000
(D) \$34,400
22. Darla spent \$120.37 on groceries in January, \$108.45 in February, and \$114.86 in March. What was the average monthly cost of Darla's groceries?
- (A) \$343.68
(B) \$110.45
(C) \$114.86
(D) \$114.56
23. Keith is driving from Reno to Kansas City to meet his girlfriend. The distance between the two cities is 1,650 miles. If Keith can average 50 miles per hour, how many hours will it take him to complete his trip?
- (A) 8 hours
(B) 30 hours
(C) 33 hours
(D) 82 hours
24. Michael needs 55 gallons of paint to paint an apartment building. He would like to purchase the paint for the least amount of money possible. Which of the following should he buy?
- (A) two 25-gallon buckets at \$550 each
(B) eleven 5-gallon buckets at \$108 each
(C) six 10-gallon buckets at \$215 each
(D) fifty-five 1-gallon buckets at \$23 each
25. As a member of FEMA, you're required to set up a contingency plan to supply meals to residents of a town devastated by a tornado. A breakfast ration weighs 12 ounces and the lunch and dinner rations weigh 18 ounces each. Assuming a food truck can carry 3 tons and that each resident will receive 3 meals per day, how many residents can you feed from one truck during a 10-day period?
- (A) 150 residents
(B) 200 residents
(C) 250 residents
(D) 300 residents
26. A train headed south for Wichita left the station at the same time a train headed north for Des Moines left the same station. The train headed for Wichita traveled at 55 miles per hour. The train headed for Des Moines traveled at 70 miles per hour. How many miles apart are the trains at the end of 3 hours?
- (A) 210 miles
(B) 165 miles
(C) 125 miles
(D) 375 miles
27. A carpenter needs to cut four sections, each 3 feet, 8 inches long, from a piece of molding. If the board is only sold by the foot, what's the shortest length of board she can buy?
- (A) 15 feet
(B) 14 feet
(C) 16 feet
(D) 12 feet

Reasoning

28. Kiya had only one coupon for 10% off one frozen turkey breast. The turkey breasts cost \$8.50 each, and Kiya wanted to buy two. How much did she pay?
- (A) \$16.15
 - (B) \$17.00
 - (C) \$15.30
 - (D) \$7.65
29. A recruiter travels 1,100 miles during a 40-hour workweek. If she spends $\frac{2}{5}$ of her time traveling, how many hours does she spend traveling?
- (A) 22
 - (B) $5\frac{1}{2}$
 - (C) 16
 - (D) 8
30. Your car uses gasoline at the rate of 21 miles per gallon. If gasoline costs \$2.82 per gallon and you drive for 7 hours at a speed of 48 miles per hour, how much will you pay for gasoline for the trip?
- (A) \$38.18
 - (B) \$45.12
 - (C) \$47.73
 - (D) 59.27

Reasoning

Answers

Reasoning



Some books that may help you score better on the Arithmetic Reasoning subtest include *Basic Math & Pre-Algebra For Dummies* by Mark Zegarelli, *Algebra For Dummies* and *Algebra II For Dummies* by Mary Jane Sterling, and *Geometry For Dummies* by Mark Ryan, as well as the related workbooks. You can also check out Mark Zegarelli's *SAT Math For Dummies* and Scott and Lisa Hatch's *SAT II Math For Dummies* for some math test practice. Also see Chapter 9 for additional practice questions.

1. **C.** Multiply 12 miles by \$3.50 per mile: $12 \times \$3.50 = \42.00 .
2. **A.** Let x equal the smaller number and $x + 8$ equal the larger number. Because the sum of the two numbers is 70, you can express this mathematically as $x + x + 8 = 70$. Now all you have to do is solve for x . Combine the like terms: $2x + 8 = 70$. Then subtract 8 from both sides of the equation: $2x + 8 - 8 = 70 - 8$, or $2x = 62$. Divide both sides of the equation by 2, and you find that x is equal to 31.
3. **D.** 144 bottles are in a gross, and $144 \div 3$ (bottles per day) = 48 days.
4. **B.** To determine Jenny's average, add the test scores and divide the sum by the number of tests she took. You want to know what she needs on the next test to achieve an average of 95, so let x equal the unknown score. Set up the equation as $(93 + 89 + 96 + 98 + x) \div 5 = 95$. Combine the like terms: $(376 + x) \div 5 = 95$. Multiplying both sides by 5 results in $376 + x = 475$, so $x = 99$.

Choice (A) is very close to the correct answer, but it isn't the best answer. If Jenny's next test score is 100, her average would be raised to 95.2.
5. **B.** Multiply the total amount spent on drinks, \$375, by 12% (or 0.12) to determine the amount of tips: $\$375 \times 0.12 = \45 .
6. **D.** You determine square footage by multiplying length by width: $12 \times 12 = 144$.
7. **C.** First determine the number of square feet of carpet you want to protect: $16 \text{ ft.} \times 18 \text{ ft.} = 288 \text{ ft.}^2$. The carpet stain protector is priced by the square yard, so divide 288 by 9 to convert square feet to square yards (because $1 \text{ yd.}^2 = 3 \text{ ft.} \times 3 \text{ ft.} = 9 \text{ ft.}^2$): $288 \text{ ft.}^2 \div 9 \text{ ft.}^2/\text{yd.} = 32 \text{ yd.}^2$.

Multiply the number of square yards by the cost of protection per square yard, \$0.65, to get the correct answer: $32 \text{ yd.}^2 \times \$0.65/\text{yd.}^2 = \$20.80$
8. **C.** Let x equal the number of cards printed and sold each month. Each card costs \$0.18 to print and sells for \$0.30. Therefore, the cost is equal to $6,000 + 0.18x$, and revenue is equal to $0.30x$. You're looking for the point where revenue is greater than the cost (revenue > cost). The inequality is $0.30x > 6,000 + 0.18x$.

Now solve for x . Subtract $0.18x$ from both sides of the inequality and then divide both sides by 0.12:
$$0.12x > 6,000$$
$$x > 50,000$$

The printing plant would have to print and sell at least 50,000 cards per month to make a profit.
9. **C.** Joe gets a 7% raise. To calculate the new wage, start off by multiplying $\$8.15 \times 0.07 = \0.57 . Then add that number (the amount of Joe's raise) to his original hourly wage. Joe's new hourly wage is $\$8.15 + \$0.57 = \$8.72$.
10. **C.** To find distance, you multiply speed by time. First find how far Alice travels before Dave catches up with her. By the time Dave leaves, Alice has already been traveling for half an hour. Three hours later, she would've been traveling for $3\frac{1}{2}$ hours at 45 mph, or 157.5 miles: $3.5 \text{ hr.} \times 45 \text{ mph} = 157.5 \text{ mi.}$ Dave has three hours to cover this distance. Now find his speed. To travel 157.5 miles in 3 hours, Dave would have to travel at 52.5 mph: $157.5 \text{ mi.} \div 3 \text{ hr.} = 52.5 \text{ mph.}$

Reasoning

11. **D.** To find the amount of pie purchased (which, by the way, does not give you the final answer), you have to add the fractions. But first the fractions need to have a common denominator. The denominators (4, 3, and 6), all divide evenly into 12, so use 12 as the common denominator.

To convert the fractions to the least common denominator of 12, do the following:

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

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

$$\frac{1}{6} \times \frac{2}{2} = \frac{2}{12}$$

Now you can add the fractions together:

$$\frac{3}{12} + \frac{4}{12} + \frac{2}{12} = \frac{3+4+2}{12} = \frac{9}{12}$$

Nine-twelfths of 20 pies is the same thing as $\frac{3}{4}$, or 75%, of the 20 pies. That equals 15 pies.

But that's *not* what the question asks. One more step: Subtract the pies sold (15) from the original 20, leaving 5 pies, which makes Choice (D) correct.

12. **A.** Subtract the sale price from the regular price to find how much she saves on each case: $\$24.00 - \$22.50 = \$1.50$. Multiply the answer by the total number of cases to get your final answer: $\$1.50 \times 5 = \7.50 .
13. **C.** Divide 30 by 8 to determine how long the security guard takes to walk one city block: $30 \div 8 = 3.75$ minutes. Then multiply 3.75 by 6, the number of blocks it takes to complete the circuit. The answer is 22.50 minutes.
14. **B.** Let x equal the original number of how much Grand Island would grow. An additional $\frac{1}{5}$ would make the population growth $\frac{6}{5}$, or 120%, of x . You can express the equation as $1.2x = 600,000$. To solve for x , divide both sides of the equation by 1.2, which gives you $x = 500,000$.
15. **D.** Divide the number of questions she has to get right (40) by the total number of questions (60) to reach $66\frac{2}{3}\%$.
16. **C.** The interest formula says that interest equals principal times rate times time, or $I = Prt$. To determine the amount of interest earned, multiply the principal (\$3,000) by the interest rate (6%) and the number of years interest accrues (1 year): $\$3,000 \times 0.06 \times 1 = \180 . Add the interest earned to the principal to show how much total money the teacher would have: $\$180 + \$3,000 = \$3,180$.
17. **B.** Recognize that if the track is a quarter mile long, then 1 mile equals four laps. Therefore, multiply 4 times 3.5 miles; the answer is 14 laps.
18. **A.** One kilometer is approximately $\frac{5}{8}$ of 1 mile, so you can multiply $75 \times \frac{5}{8}$: $75 \times 5 = 375$, and $375 \div 8$ equals about 46.8. Therefore, Karl was traveling at 47 miles per hour.
19. **A.** You need to add the carpenter's base pay and overtime pay to find his total pay for the week. First find his base pay per week: $\$12.30/\text{hr.} \times 40 \text{ hr.} = \492 . Then find his overtime rate per hour, which is $1\frac{1}{2}$ times his base pay: $\$12.30/\text{hr.} \times 1.5 = \18.45 . Multiply this rate by the number of hours of overtime to find his overtime pay: $\$18.45/\text{hr.} \times 6 \text{ hr.} = \110.70 . Finally, add his base pay and overtime pay to find his total pay for the week: $\$492.00 + \$110.70 = \$602.70$.
20. **A.** The office has 1,260 square feet of space (multiply 42 square feet by 30 employees). With 35 employees, each employee will have 36 square feet of work space ($1,260 \div 35$), which is 6 square feet less than originally.

Reasoning

21. **B.** The total cost is the down payment plus 5 years' worth of monthly payments. Five years contain 60 months, so multiply \$450 (monthly payment) \times 60 = \$27,000 (total payments). Then add \$27,000 (total payments) + \$2,000 (down payment) = \$29,000 (total cost).
22. **D.** Add the three monthly amounts to determine the total amount Darla spent on groceries: \$120.37 + \$108.45 + \$114.86 = \$343.68. Divide the total by 3 to determine the average monthly cost: \$114.56.
23. **C.** Distance equals speed times time, so divide the total distance by Keith's average speed to find how long the trip took: 1,650 mi. \div 50 mph = 33 hr.
24. **B.** Choice (A) doesn't provide enough paint (2×25 gal. = 50 gal.), so it's wrong. Now determine the cost of each of the other options:
- Choice (B): $11 \times \$108 = \$1,188$
- Choice (C): $6 \times \$215 = \$1,290$
- Choice (D): $55 \times \$23 = \$1,265$

The lowest price is \$1,188, Choice (B).

25. **B.** First find how many ounces of rations each truck can hold. One ton is 2,000 pounds, so one truck can carry three times that, or 6,000 pounds. There are 16 ounces in a pound, so one truck can carry 96,000 ounces: 6,000 lbs. \times 16 oz. = 96,000 oz.
- Then figure out how many daily rations are in a truckload. The total daily ration for each resident is 12 ounces + 18 ounces + 18 ounces, or 48 ounces. You can express the number of daily rations supplied as $96,000 \text{ oz.} \div 48 \text{ oz./daily ration} = 2,000$ daily rations. These rations need to last 10 days. Dividing 2,000 by 10 days results in 200 residents who can be fed by one truck during this 10-day period.
26. **D.** The train headed for Wichita traveled 55 miles/hour \times 3 hours = 165 total miles. The train headed for Des Moines traveled 70 miles/hour \times 3 hours = 210 total miles. Adding the distances together gives you the number of miles apart the two trains are after three hours: $210 + 165 = 375$. **Another option:** You can add the two rates of speed ($55 + 70$) and multiply the sum by 3 hours ($125 \times 3 \text{ hours} = 375$).
27. **A.** Convert the mixed number to inches: 3 feet, 8 inches equals 44 inches ($12 \text{ in./ft.} \times 3 \text{ ft.} = 36 \text{ in.}$, and $36 \text{ in.} + 8 \text{ in.} = 44 \text{ in.}$). Forty-four inches (length each section needs to be) \times 4 (number of sections needed) = 176 inches (total molding needed). To find the amount of molding needed in feet, convert 176 inches into feet by dividing 176 inches by 12 inches. You get $14\frac{2}{3}$ feet, so the shortest board length necessary is 15 feet.
28. **A.** One turkey breast costs \$8.50 minus 10% of \$8.50 (which is \$0.85), or $\$8.50 - \$0.85 = \$7.65$. The other turkey breast is full price, so add the two costs: $\$7.65 + \$8.50 = \$16.15$.
29. **C.** Don't let the number of miles traveled confuse you. You don't use them to solve the problem. Finding $\frac{2}{5}$ of a 40-hour work week is the same thing as multiplying 40 times 2, which is 80, and then dividing 80 by 5, which equals 16 hours the recruiter travels weekly.
30. **B.** Your first step is to determine the number of miles traveled. Multiply the rate of travel by the time: $48 \times 7 = 336$ mi. The amount of gas used is the total miles driven divided by the number of miles per gallon: $336 \div 21 = 16$ gal. used. At the price of \$2.82 per gallon, you spent \$45.12 for gas: $\$2.82 \times 16 = \45.12 .