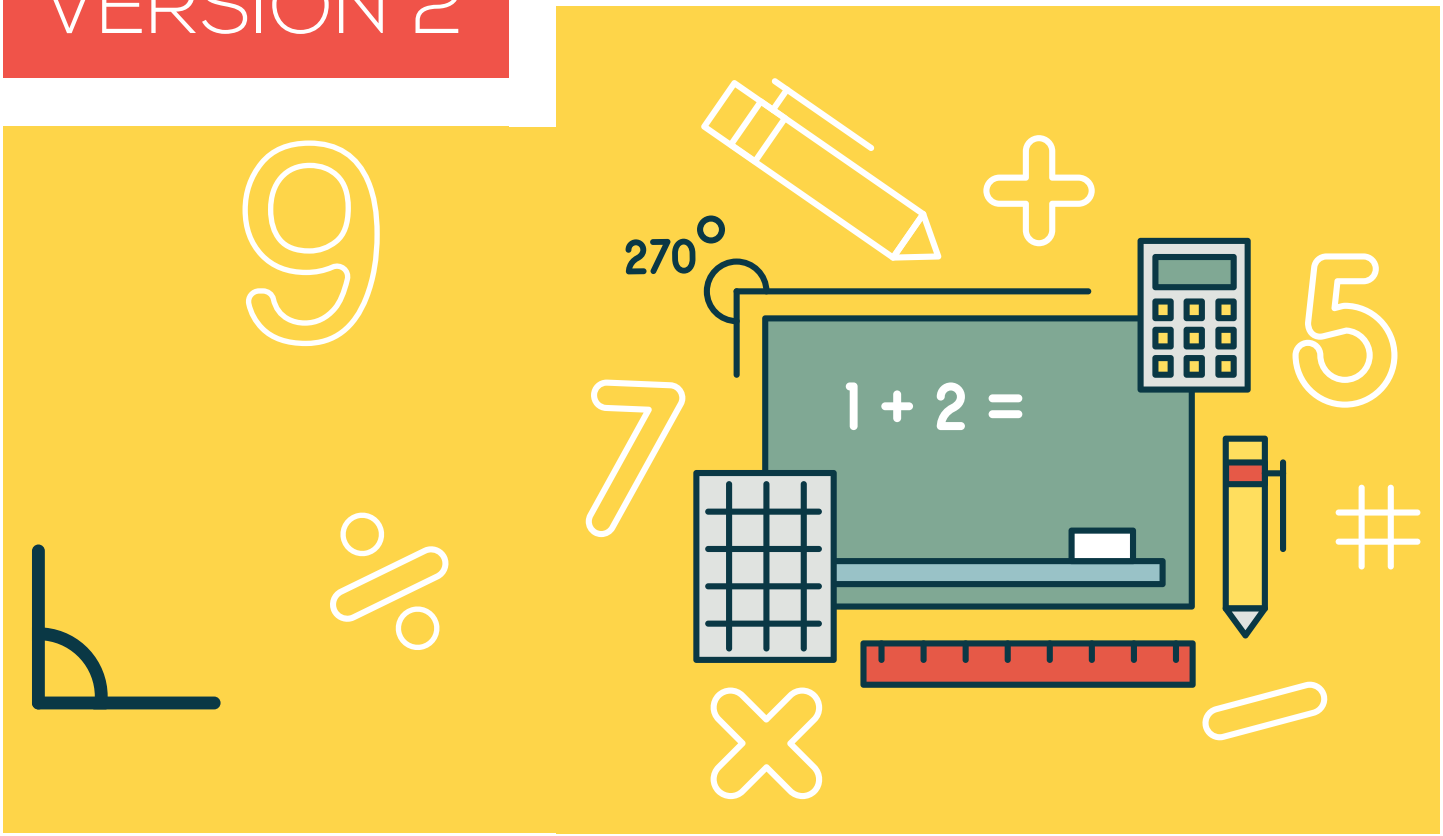
BASIC ARITHMETIC
STUDY GUIDE
& SAMPLE TEST QUESTIONS

VERSION 2

COUNTY OF LOS ANGELES



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Los Angeles County
Human Resources
YOUR CAREER STARTS HERE.

WELCOME

Thank you for your interest in employment with the County of Los Angeles. This guide is designed to familiarize and assist you with preparing for examinations containing multiple-choice basic arithmetic items. The sample questions provided in this study guide are intended to give you an idea of the kinds of basic arithmetic items you may encounter in County tests. However, it is important to note that actual test questions will vary in format, content, and level of difficulty, depending on the job class being tested.

ABOUT THE COUNTY'S EXAMINATIONS

As an Equal Opportunity Employer, the County of Los Angeles takes steps to ensure that our exam content is job-related. We conduct studies to determine the knowledge, skills, abilities and personal characteristics that are essential to satisfactorily perform the duties of the job. These studies assist us in developing the content of our examinations. Testing applicants for jobs provides us with an objective and cost-effective means to assess the qualifications of our applicants.

HOW SHOULD I PREPARE FOR THE WRITTEN TEST?

To prepare for the written test, you should study the concepts assessed in each section. It is likely that there will be several sections to the written test in addition to arithmetic; thus, it is to your benefit to carefully read the job bulletin to determine the knowledge, skill, and ability areas the written test will cover. In addition, it is important that you read the entire written test notice for the location and time of the written test as well as for parking instructions and other important information. Pay special attention to whether testing aids/materials such as handheld calculators are allowed in the written test. If the test notice indicates that testing aids/materials are allowed, then you are strongly advised to bring these with you, as they will not be provided. On the test day, it is recommended that you arrive 15 minutes prior to the test's starting time, wear comfortable clothes, bring an accurate watch, and make sure you are well-rested. Also, remember to bring your test notice and a picture I.D. such as a driver license, or you may not be admitted into the test!

NOTE: Applicants who require special testing arrangements such as readers or interpreters must provide seven (7) days advance notice of their disability and requested accommodation. Check the front side of the job bulletin for telephone numbers to call and make disability accommodation requests. The County will attempt to meet reasonable accommodation requests whenever possible.

TEST-TAKING TIPS

Most County examinations have a set time limit, so it is important that you work quickly, but not so fast as to become careless. Always read all the possible choices before selecting your answer. If you do not know the answer to a problem, it is usually best to skip it and move on to the others. Note that on most County examinations, your score is based on the number of correct responses. If you are not sure of the answer to a problem, eliminate the answers you believe are wrong, and mark the choice that is your best response. Above all, budget your time, pace yourself, and avoid getting bogged down on any single question.

SAMPLE BASIC ARITHMETIC QUESTIONS

Basic arithmetic items test your knowledge of, and ability to interpret and solve problems of a mathematical nature, using such operations as addition, subtraction, division, and multiplication, and in a variety of problem formats and situations. However, actual problems will vary from one test to another. For example, a test problem may require you to calculate the totals in a supply budget, much like you may be asked to do in the position for which you are testing. The following are examples of the types of basic arithmetic problems most common to County examinations. Answers and explanations for the problems begin on page 8 of this study guide. A glossary of mathematical terms has also been included on page 7 for your reference.

1. $2520 \div 5 =$

   A. 502
   B. 503
   C. 504
   D. 505

2.
$$\begin{array}{r} 546 \\ \times \quad 25 \\ \hline \end{array}$$

   A. 13,650
   B. 13,750
   C. 14,550
   D. 14,650

3. $7/10 - 9/20 =$

   A. 1/3
   B. 1/4
   C. 1/5
   D. 1/6

4. $15.859 - 6.5147 =$

   A. 9.3443
   B. 9.4443
   C. 9.5443
   D. 9.6443

5. 90 is what percent of 500?

   A. 17
   B. 18
   C. 19
   D. 20

6.
16 feet, 5 inches
10 feet, 4 inches
\+ 4 feet, 8 inches

A. 29 feet, 5 inches
B. 30 feet, 4 inches
C. 31 feet, 5 inches
D. 31 feet, 4 inches

7.
10 days, 12 hours, 25 minutes
7 days, 15 hours, 36 minutes
3 days, 21 hours, 14 minutes
\+ 11 hours, 10 minutes

A. 22 days, 12 hours, 25 minutes
B. 22 days, 18 hours, 25 minutes
C. 23 days, 20 hours, 25 minutes
D. 23 days, 22 hours, 25 minutes

8. An industrial machine in a department uses 4.75 gallons of fuel each hour. At that rate, how many gallons of fuel will be used in five 8-hour workdays?

A. 160
B. 170
C. 180
D. 190

9. If three-fifths of Stanley's weekly income is $360, what is one-third of his weekly income?

A. $150
B. $175
C. $200
D. $250

10. An employee receives a bonus at the end of each quarter based on her salary for the year. If she earns $1,800 per month, and her bonus is 3.5% of her yearly salary, her bonus for the previous quarter is

A. $656.
B. $700.
C. $756.
D. $786.

11. An employee takes out a loan from his 401(k) savings account that he must repay in a 26-week period. If he makes regular payments of $108.24 every two weeks, what is the amount of the loan?

A. $1,407.12
B. $1,907.54
C. $2,414.12
D. $2,814.50

12. In a social service agency, Clerk A can pull 30 case files in one hour. Clerk B can pull 20 case files in the same amount of time. Working together, how many case files can the two clerks pull in an 8-hour period?

A. 360
B. 400
C. 440
D. 480

13. A room that measured 8’ x 14’ was enlarged to 10’ x 16’. How many square feet of floor space were added?

A. 41
B. 43
C. 45
D. 48

14. A manufacturer packages drill bits in boxes that can hold 12 bits each. The boxes are then placed in crates that can hold 13 boxes each. If a storekeeper receives a shipment of 15 crates, how many bits are contained in the shipment?

A. 2,340
B. 2,450
C. 2,560
D. 2,680

15. A division chief in a department wants to purchase new desks for an office. The full price for each desk is $250.00. The department has an agreement with a vendor to provide a four percent discount on each desk purchased. If the department has budgeted $7,200.00 for the new desks, the number of desks that may be purchased is

A. 27.
B. 28.
C. 30.
D. 31.

16. If XYZ County signs a lease contract for office equipment for $343.15 per month, how much is the total cost if the contract is for 2.5 years?

A. $ 8,750.75
B. $ 9,676.50
C. $ 10,294.50
D. $ 12,146.00

17. If a department receives a $6.00 rebate for every used printer cartridge that it returns to the manufacturer, how much revenue would the department receive per month if 171 cartridges are used per quarter year?

A. $251.00
B. $273.00
C. $326.00
D. $342.00

18. If Marisol reduces the weekly number of hours she works by one-fifth and her current weekly income is $690.00, what is her new weekly income?

A. $522.00
B. $542.00
C. $552.00
D. $562.00

19. Paul's salary is $2195.00 per month. If he receives a salary increase of 3%, his new monthly salary is

A. $2260.85.
B. $2280.00.
C. $2385.00.
D. $2453.50.

20. If ABC County signs a lease contract for 25 carpool vehicles for $11,000 per month, what is the yearly cost per vehicle?

A. $5,030
B. $5,280
C. $6,140
D. $6,250

GLOSSARY OF MATHEMATICAL TERMS

Area:	The number of square units that covers a shape or figure.
Denominator:	The bottom part of a fraction. (Example: in the fraction ¾, 4 is the denominator.)
Digit:	The ten numerals 0, 1, 2, 3, 4, 5, 6, 7, 8, and 9. The number 14 has two digits: 1 and 4.
Difference:	The result of subtracting one number from another.
Divisor:	In a division problem, the number that is divided into another (For example when dividing 4 into 20, the 4 would be the divisor, as it is used to divide the number 20 into five parts).
Factor:	One of two or more numerical values that are multiplied together to yield a product.
Fraction:	A number expressed in terms of a numerator and denominator.
Least Common Multiple:	The smallest, non-zero multiple of the denominators of two or more fractions.
Numerator:	The top part of a fraction. (Example, in the fraction ¾ 3 is the numerator).
Operation:	Any one of the basic arithmetic functions of addition, subtraction, multiplication, or division.
Product:	The result of two numbers being multiplied together.
Quotient:	The result of dividing one number into another.
Sum:	The result of adding together two or more numbers.

ANSWERS AND EXPLANATIONS TO ARITHMETIC SAMPLE QUESTIONS

NOTE: Typically, there are multiple ways of obtaining the correct answer to each question, only one of which is provided as the answer explanation. Use the glossary on page 7 to help you define any terms with which you may be unfamiliar.

1. **Correct Answer: C**
   - Set up the problem by placing the number to be divided (2520) inside the bar and the divisor (5) to the left of the vertical bar (Step #1).
   - Determine how many times 25 can be divided by 5 and place the number (5) over the 25. Multiply the number (5) by the divisor (5) and subtract the result (25) from the number divided (25), leaving no remainder (Step #2).
   - Carry down the next digit in 2520 (2) and repeat the steps until all the possibilities of division have been exhausted and there are no other numbers to be divided (Step #3).

STEP #1	*STEP #2*	*STEP #3*
5⟌ 2520	5 5⟌ 2520 - 25 0	504 5⟌ 2520 - 25 20 - 20 0

2. **Correct Answer: A**
   - Working from right to left, multiply 546 by each of the two digits in the factor "25" separately. You may wish to add zero placeholders (shown in bold) to help ensure that columns are aligned correctly (Step #1).
   - Add the products from Step #1 to arrive at the correct answer (Step #2).

STEP #1	*STEP #2*
546 x 25 2730 1092**0**	546 x 25 2730 + 1092**0** 13650

3. **<u>Correct Answer</u>: B**

- To solve, find the least common multiple (LCM) for the denominator of each fraction. The LCM is the smallest non-zero number that is a multiple of both denominators. In this problem, the LCM is 20.
- Since 9/20 already has a denominator of 20, only 7/10 needs to be converted so that has a denominator of 20. Multiplying the denominator (10) by 2 converts it to 20; therefore, to convert the fraction 7/10, multiply both the numerator (7) and the denominator (10) by 2, so that the fraction becomes 14/20 (Step #1).
- Subtract 9/20 from 14/20 (by subtracting the numerators), for a difference of 5/20 (Step #2).
- Simplify 5/20 by dividing the numerator and denominator each by 5, to equal 1/4 (Step #3).

<u>STEP #1</u>	*<u>STEP #2</u>*	*<u>STEP #3</u>*
$\frac{7 \times 2}{10 \times 2} = \frac{14}{20}$	$\frac{14}{20} - \frac{9}{20} = \frac{5}{20}$	$\frac{5 \div 5}{20 \div 5} = \frac{1}{4}$

4. **<u>Correct Answer</u>: A**

- Set up the problem by lining numbers up vertically, aligning all decimal points. You may wish to add zero placeholders to ensure that columns are aligned appropriately (Step #1).
- Working right to left, set up the problem for solving by carrying values over only when the top value for a column is less than its bottom value (Step #2).
- Subtract all values to determine the difference (Step #3).

<u>STEP #1</u>	*<u>STEP #2</u>*	*<u>STEP #3</u>*
15.859**0** - 6.5147	*8 10* 15.859**0** - 6.5147	*8 10* 15.859**0** - 6.5147 9.3443

5. **Correct Answer: B**

- Divide 90 by 500. Set up the problem by adding a decimal point and zero placeholders (shown in bold) to make 90 into 90.**00**. Next, determine the decimal place for the answer by counting the number of zero placeholders you added to 90 to make it divisible by 500. Since two zeros were added to 90, count backwards from right to left two decimal places to convert the answer to .18 (Step #1).
- Multiply .18 by 100 to convert it to a percent. Add a decimal point and two zero placeholders (shown in bold) to make 100 into 100.**00** to match the number of decimal places in the number it is being multiplied with (.18) and vertically align the decimal points in the two numbers. Count the number of decimal places to the right of the decimal point in 100.00 and .18 (which equals four) to determine that the answer should also have four decimal places. Count backwards from right to left four places and insert a decimal point, which results in 18.0000, or 18 (Step #2).

STEP #1	*STEP #2*
.18	
500 | 90.**00**	100.**00**
-50.0	x .18
40.00	80000
40.00	+10000
0	180000
	18.0000

6. **Correct Answer: C**

- Add the measurements in the inches column, for a total of 17 inches (Step #1).
- Since 12 inches equals 1 foot, convert the 17 inches into 1 foot, 5 inches; carry the 1 foot into the feet measurement column; and sum (Step #2).

STEP #1		*STEP #2*	
		1 foot	
16 feet,	5 inches	16 feet,	5 inches
10 feet,	4 inches	10 feet,	4 inches
+ 4 feet,	8 inches	+ 4 feet,	8 inches
	17 inches	31 feet,	5 inches

7. **Correct Answer: A**

- Add the measurements in the minutes column for a total of 85 minutes (Step #1).
- Since 60 minutes equals 1 hour, convert the 85 minutes from Step #1 into 1 hour, 25 minutes; carry the 1 hour into the hours measurement column; and sum for a total of 60 hours (Step #2).
- Since 24 hours equals 1 day, convert the 60 hours into 2 days, 12 hours; carry the 2 days into the days measurement column; and sum for a total of 22 days (Step #3).

STEP #1			*STEP # 2*			*STEP #3*		
						2 days	*1 hour*	
10 days,	12 hours,	25 minutes	10 days,	12 hours,	25 minutes	10 days,	12 hours,	25 minutes
7 days,	15 hours,	36 minutes	7 days,	15 hours,	36 minutes	7 days,	15 hours,	36 minutes
3 days,	21 hours,	14 minutes	3 days,	21 hours,	14 minutes	3 days,	21 hours,	14 minutes
+	11 hours,	10 minutes	+	11 hours,	10 minutes	+	11 hours,	10 minutes
		85 minutes		60 hours,	25 minutes	22 days,	12 hours,	25 minutes

8. **Correct Answer: D**

- Multiply 4.75 by 8 to determine that 38 gallons of fuel are used in one 8-hour workday (Step #1).
- Multiply 38 by 5 to determine that 190 gallons of fuel are used in five 8-hour workdays (Step #2).

STEP #1	*STEP # 2*
4.75	38
x 8	x 5
38	190

9. **Correct Answer: C**

- Since \$360 is three-fifths of Stanley's income, divide 360 by 3 to determine that \$120 is one-fifth of his income (Step #1).
- Multiply \$120 by 5 to determine that \$600 is Stanley's weekly income (Step #2).
- Divide \$600 by 3 to determine that \$200 is one-third of his weekly income (Step #3).

STEP #1	*STEP #2*	*STEP #3*
120	120	200
3 | 360	x 5	3 | 600
-3	600	-6
06		00
-6		-0
00		00

10. **Correct Answer: C**

- Multiply $1,800 by 12 to determine that $21,600 is the employee's yearly salary (Step #1).
- Multiply $21,600 by the decimal equivalent of 3.5% (.035) to determine that $756 is the amount of the bonus (Step #2).

STEP #1

$$\begin{array}{r} \$1800 \\ \times \quad 12 \\ \hline \$21600 \end{array}$$

STEP #2

$$\begin{array}{r} 21600 \\ \times \quad .035 \\ \hline 108000 \\ 64800 \\ +0000 \\ \hline 756000 \end{array}$$

$756.00

11. **Correct answer: A**

- Divide the amount of each payment ($108.24) by 2 to determine that $54.12 is the weekly amount that the employee will pay during the 26-week period (Step #1).
- Multiply $54.12 by 26 to determine that $1,407.12 is the total amount of the loan payment (Step #2).

STEP #1

$$\begin{array}{r} 54.12 \\ 2\overline{)\,108.24} \\ \underline{-10} \\ 8 \\ \underline{-8} \\ 2 \\ \underline{-\ 2} \\ 4 \\ \underline{-4} \\ 0 \end{array}$$

STEP #2

$$\begin{array}{r} 54.12 \\ \times \quad 26 \\ \hline 32472 \\ +10824 \\ \hline 140712 \end{array}$$

$1,407.12

12. **Correct Answer: B**

- Add the number of cases that each clerk can pull to determine that the two clerks together can pull 50 cases in one hour (Step #1).
- Multiply 50 by 8 to determine that 400 cases can be pulled by the two clerks together in an 8-hour period (Step #2).

STEP #1

$$\begin{array}{r} 30 \\ +\ 20 \\ \hline 50 \end{array}$$

STEP #2

$$\begin{array}{r} 50 \\ \times \quad 8 \\ \hline 400 \end{array}$$

13. **Correct Answer: D**

- Find the total area of both the original tool room and the enlarged tool room (Step #1). The formula for area is A = L x W, where A = area; L= length; and W = width. The product is expressed in square feet.
- Subtract the area of the original tool room from the area of the enlarged tool room to determine the amount of floor space that was added (Step #2).

STEP #1

Original room measurement: 8' x 14' = 112 square feet
Enlarged room measurement: 10' x 16' = 160 square feet

STEP #2

160 - 112 = 48 square feet

14. **Correct Answer: A**

- Multiply the number of bits per box (12) by the number of boxes in a crate (13) to determine that 1 crate contains 156 bits (Step #1).
- Multiply the number of bits per crate (156) by 15 to determine that there are 2,340 bits contained in 15 crates (Step #2).

STEP #1	*STEP #2*
12	156
x 13	x 15
36	780
+12	+156
156	2340

15. **Correct Answer: C**

- Multiply the full price of each desk ($250) by the decimal equivalent of the discount (.04) to determine that $10.00 is the amount of the discount (Step #1).
- Subtract $10.00 from the full price of each desk ($250) to determine that $240 is the discounted price that the department will pay for each desk (Step #2).
- Divide the department's total budget ($7,200) by the discounted cost of each desk ($240) to determine that the department may purchase 30 desks (Step #3).

STEP #1	*STEP #2*	*STEP #3*
$250	$250	30
x .04	- 10	240 | 7200
$10.00	$240	-720
		00

16. **Correct Answer: C**

- Find out how many months there are in 2.5 years. Since there are 12 months in one year, multiply 2.5 by 12. You may wish to add zero placeholders (shown in bold) to ensure that columns are aligned correctly. This yields 30 months (Step #1).
- Multiply 30 by the payment amount ($343.15) for an answer of $10,294.50 (Step #2), the total amount that would be paid at the end of a 2.5 year period.

STEP #1	*STEP #2*
2.5	343.15
x 12	x 30
50	00000
+250	+10294500
300	1029450
30.0	10294.50

17. **Correct Answer: D**

- Find out how much revenue the department receives per quarter by multiplying the number of cartridges used per quarter (171) by the amount of the rebate ($6.00). You may wish to add zero placeholders (shown in bold) to ensure that columns are aligned correctly. This yields an answer of $1026.00 (Step #1).
- Multiply the number of months in one year (12) by the decimal equivalent of one quarter (.25) to determine that there are 3 months in one quarter year (Step #2).
- Divide the quarterly revenue received ($1026.00) by the number of months in a quarter (3) to determine that the department will receive $342.00 per month (Step #3).

STEP #1	*STEP #2*	*STEP #3*
171	12	342.00
x 6.00	x .25	3 | 1026.00
000	60	- 9
0000	+240	12
+102600	300	-12
102600		06
		- 6
$1026.00	3.00	0

18. **Correct Answer: C**

- Convert the fraction one-fifth (1/5) to a decimal by dividing the numerator in the fraction (1) by the denominator (5). Set up the problem by adding a decimal point and a zero placeholder (shown in bold), to make 1 into 1.0. Next, determine the decimal place for the answer by counting the number of zeros you added to 1 to make it divisible by 5. Since one zero was added to 1, count backwards from right to left one decimal place and convert the answer to .2 (Step #1).
- Multiply .2 by $690.00 to determine that $138.00 is one-fifth of Marisol's weekly income. You may wish to add zero placeholders (shown in bold) to ensure that columns are aligned correctly (Step #2).
- Subtract $138.00 from $690.00 to get $552.00, which is Marisol's new total weekly income (Step #3).

STEP #1	*STEP #2*	*STEP #3*
.2	690	$690.00
5 ⟌ 1.**0**	x .2	- $138.00
- 1.0	1380	$552.00
0		
	$138.00	

19. **Correct Answer: A**

- Convert 3% to a decimal by dividing 3 by 100. Set up the problem by adding a decimal point and zero placeholders (shown in bold), to make 3 into 3.00. Next, determine the decimal place for the answer by counting the number of zeros you added to 3 to make it divisible by 100. Since two zeros were added to 3, count backwards from right to left two decimal places and place a 0 before the 3 to convert the answer to .03 (Step #1).
- Multiply $2195.00 by .03 to determine the amount of Paul's pay raise, to yield an answer of $65.85 (Step #2).
- Making sure to carry values over across columns as necessary, add $65.85 to Paul's previous salary for the sum of $2260.85, his new monthly salary (Step #3).

STEP #1	*STEP #2*	*STEP #3*
.03		*11*
100 ⟌ 3.**00**	$2195.00	$2195.00
-3.00	x .03	+$ 65.85
0	$65.8500	$2260.85

20. **<u>Correct Answer</u>: B**

- Determine the monthly cost per vehicle by dividing the total monthly cost ($11,000) by the total number of vehicles leased (25), for an answer of $440.00 (Step #1).
- Multiply the monthly cost per vehicle by the number of months in one year (12) to determine that $5,280 is the yearly cost per vehicle (Step #2).

<u>STEP #1</u>

```
    440
25 | 11000
   -100
    100
   -100
      0
```

<u>STEP #2</u>

```
   440
 x  12
  880
+440 0
 5280
```