

# Basic Algebra

1. If Lynn can type a page in  $p$  minutes, what piece of the page can she do in 5 minutes?

- A.  $5/p$
- B.  $p - 5$
- C.  $p + 5$
- D.  $p/5$
- E.  $1 - p + 5$

2. If Sally can paint a house in 4 hours, and John can paint the same house in 6 hour, how long will it take for both of them to paint the house together?

- A. 2 hours and 24 minutes
- B. 3 hours and 12 minutes
- C. 3 hours and 44 minutes
- D. 4 hours and 10 minutes
- E. 4 hours and 33 minutes

3. Employees of a discount appliance store receive an additional 20% off of the lowest price on an item. If an employee purchases a dishwasher during a 15% off sale, how much will he pay if the dishwasher originally cost \$450?

- A. \$280.90
- B. \$287
- C. \$292.50
- D. \$306
- E. \$333.89

4. The sales price of a car is \$12,590, which is 20% off the original price. What is the original price?

A. \$14,310.40

B. \$14,990.90

C. \$15,290.70

D. \$15,737.50

E. \$16,935.80

5. Solve the following equation for A :  $\frac{2A}{3} = 8 + 4A$

A. -2.4

B. 2.4

C. 1.3

D. -1.3

E. 0

6. If Leah is 6 years older than Sue, and John is 5 years older than Leah, and the total of their ages is 41. Then how old is Sue?

A. 8

B. 10

C. 14

D. 19

E. 21

7. Alfred wants to invest \$4,000 at 6% simple interest rate for 5 years. How much interest will he receive?

- A. \$240
- B. \$480
- C. \$720
- D. \$960
- E. \$1,200

8. Jim is able to sell a hand-carved statue for \$670 which was a 35% profit over his cost. How much did the statue originally cost him?

- A. \$496.30
- B. \$512.40
- C. \$555.40
- D. \$574.90
- E. \$588.20

9. The city council has decided to add a 0.3% tax on motel and hotel rooms. If a traveler spends the night in a motel room that costs \$55 before taxes, how much will the city receive in taxes from him?

- A. 10 cents
- B. 11 cents
- C. 15 cents
- D. 17 cents
- E. 21 cents

10. A student receives his grade report from a local community college, but the GPA is smudged. He took the following classes: a 2 hour credit art, a 3 hour credit history, a 4 hour credit science course, a 3 hour credit mathematics course, and a 1 hour science lab. He received a "B" in the art class, an "A" in the history class, a "C" in the science class, a "B" in the mathematics class, and an "A" in the science lab. What was his GPA if the letter grades are based on a 4 point scale? (A=4, B=3, C=2, D=1, F=0)

- A. 2.7
- B. 2.8
- C. 3.0
- D. 3.1
- E. 3.2

11. Simon arrived at work at 8:15 A.M. and left work at 10: 30 P.M. If Simon gets paid by the hour at a rate of \$10 and time and  $\frac{1}{2}$  for any hours worked over 8 in a day. How much did Simon get paid?

- A. \$120.25
- B. \$160.75
- C. \$173.75
- D. \$180
- E. \$182.50

12. Grace has 16 jellybeans in her pocket. She has 8 red ones, 4 green ones, and 4 blue ones. What is the minimum number of jellybeans she must take out of her pocket to ensure that she has one of each color?

- A. 4
- B. 8
- C. 12

D. 13

E. 16

13. If  $r = 5z$  then  $15z = 3y$ , then  $r =$

A.  $y$

B.  $2y$

C.  $5y$

D.  $10y$

E.  $15y$

14. If 300 jellybeans cost you  $x$  dollars. How many jellybeans can you purchase for 50 cents at the same rate?

A.  $150/x$

B.  $150x$

C.  $6x$

D.  $1500/x$

E.  $600x$

15. Lee worked 22 hours this week and made \$132. If she works 15 hours next week at the same pay rate, how much will she make?

A. \$57

B. \$90

C. \$104

D. \$112

E. \$122

16. If  $8x + 5x + 2x + 4x = 114$ , the  $5x + 3 =$

A. 12

B. 25

C. 33

D. 47

E. 86

17. You need to purchase a textbook for nursing school. The book cost \$80.00, and the sales tax where you are purchasing the book is 8.25%. You have \$100. How much change will you receive back?

A. \$5.20

B. \$7.35

C. \$13.40

D. \$19.95

E. \$21.25

18. You purchase a car making a down payment of \$3,000 and 6 monthly payments of \$225. How much have you paid so far for the car?

A. \$3225

B. \$4350

C. \$5375

D. \$6550

E. \$6398

19. Your supervisor instructs you to purchase 240 pens and 6 staplers for the nurse's station. Pens are purchased in sets of 6 for \$2.35 per pack. Staplers are sold in sets of 2 for 12.95. How much will purchasing these products cost?

A. \$132.85

B. \$145.75

C. \$162.90

D. \$225.25

E. \$226.75

20. If  $y = 3$ , then  $y^3(y^3 - y) =$

A. 300

B. 459

C. 648

D. 999

E. 1099

#### Answers & Explanations

1. A: The following proportion may be written:  $1/p = x/5$ . Solving for the variable,  $x$ , gives  $xp = 5$ , where  $x = 5/p$ . So, Lynn can type  $5/p$  pages, in 5 minutes.

2. A: Sally can paint  $\frac{1}{4}$  of the house in 1 hour. John can paint  $\frac{1}{6}$  of the same house in 1 hour. In order to determine how long it will take them to paint the house, when working together, the following equation may be written:  $\frac{1}{4}x + \frac{1}{6}x = 1$ . Solving for  $x$  gives  $\frac{5}{12}x = 1$ , where  $x = 2.4$  hours, or 2 hours, 24 minutes.

3. D: Sale Price =  $\$450 - 0.15(\$450) = \$382.50$ , Employee Price =  $\$382.50 - 0.2(\$382.50) = \$306$

4. D:  $\$12,590 = \text{Original Price} - 0.2(\text{Original Price}) = 0.8(\text{Original Price})$ , Original Price =  $\$12,590/0.8 = \$15,737.50$

5. A: In order to solve for  $A$ , both sides of the equation may first be multiplied by 3. This is written as  $3(2A/3) = 3(8+4A)$  or  $2A = 24 + 12A$ . Subtraction of  $12A$  from both sides of the equation gives  $-10A = 24$ . Division by  $-10$  gives  $A = -2.4$ .

6. A: Three equations may initially be written to represent the given information. Since the sum of the three ages is 41, we may write,  $l + s + j = 41$ , where  $l$  represents Leah's age,  $s$  represents Sue's age, and  $j$  represents John's age. We also know that Leah is 6 years older than Sue, so we may write the equation,  $l = s + 6$ . Since John is 5 years older than Leah, we may also write the equation,  $j = l + 5$ . The expression for  $l$ , or  $s + 6$ , may be substituted into the equation,  $j = l + 5$ , giving  $j = s + 6 + 5$ , or  $j = s + 11$ . Now, the expressions for  $l$  and  $j$  may be substituted into the equation, representing the sum of their ages. Doing so gives:  $s + 6 + s + s + 11 = 41$ , or  $3s = 24$ , where  $s = 8$ . Thus, Sue is 8 years old.

7. E: Simple interest is represented by the formula,  $I = Prt$ , where  $P$  represents the principal amount,  $r$  represents the interest rate, and  $t$  represents the time. Substituting  $\$4,000$  for  $P$ ,  $0.06$  for  $r$ , and  $5$  for  $t$  gives  $I = (4000)(0.06)(5)$ , or  $I = 1,200$ . So, he will receive  $\$1,200$  in interest.

8. A:  $\$670 = \text{Cost} + 0.35(\text{Cost}) = 1.35(\text{Cost})$ , Cost =  $\$670/1.35 = \$496.30$

9. D: The amount of taxes is equal to  $\$55 * 0.003$ , or  $\$0.165$ . Rounding to the nearest cent gives 17 cents.



10. C: The GPA may be calculated by writing the expression,  $((3*2)+(4*3)+(2*4)+(3*3)+(4*1))/13$ , which equals 3, or 3.0.

11. C: From 8:15 A.M. to 4:15 P.M., he gets paid \$10 per hour, with the total amount paid represented by the equation,  $\$10*8=\$80$ . From 4:15 P.M. to 10:30 P.M., he gets paid \$15 per hour, with the total amount paid represented by the equation,  $\$15*6.25=\$93.75$ . The sum of \$80 and \$93.75 is \$173.75, so he was paid \$173.75 for 14.25 hours of work.

12. D: If she removes 13 jellybeans from her pocket, she will have 3 jellybeans left, with each color represented. If she removes only 12 jellybeans, green or blue may not be represented.

13. A: The value of  $z$  may be determined by dividing both sides of the equation,  $r=5z$ , by 5. Doing so gives  $r/5=z$ . Substituting  $r/5$  for the variable,  $z$ , in the equation,  $15z=3y$ , gives  $15(r/5)=3y$ . Solving for  $y$  gives  $r = y$ .

14. A: 50 cents is half of one dollar, thus the ratio is written as half of 300, or 150, to  $x$ . The equation representing this situation is  $300/x*1/2=150/x$ .

15. B: The following proportion may be used to determine how much Lee will make next week:  $22/132=15/x$ . Solving for  $x$  gives  $x = 90$ . Thus, she will make \$90 next week, if she works 15 hours.

16. C: The given equation should be solved for  $x$ . Doing so gives  $x = 6$ . Substituting the  $x$ -value of 6 into the expression,  $5x + 3$ , gives  $5(6) + 3$ , or 33.

17. C: The amount you will pay for the book may be represented by the expression,  $80+(80*0.0825)$ . Thus, you will pay \$86.60 for the book. The change you will receive is equal to the difference of \$100 and \$86.60, or \$13.40.

18. B: The amount you have paid for the car may be written as  $\$3,000 + 6(\$225)$ , which equals \$4,350.

19. A: You will need 40 packs of pens and 3 sets of staplers. Thus, the total cost may be represented by the expression,  $40(2.35) + 3(12.95)$ . The total cost is \$132.85.

20. C: Substituting 3 for  $y$  gives  $33(33-3)$ , which equals  $27(27 - 3)$ , or  $27(24)$ . Thus, the expression equals 648.