Summer Math
Pre and Post Tests
for
Post Algebra 1

(for students who have completed non-honors Algebra I this past year)

Name__________________________________
Please read the directions (separate document) completely before starting your packet!

Print out the packet so you can record your work. This will be turned in to your teacher in August.

REMEMBER – ALL ANSWERS (letter choice or student generated response) MUST BE INPUTTED ONLINE AT THE WEBSITE www.classmarker.com. If you lose or forget your username and password, email Mr. Toth at ttoth@communityschoolnaples.org.

Even though you will be inputting your answers online we have included a blank “answer sheet” to help organize your answers. You can write your letter choice (or numeric value for student generated responses) in the blank next to each problem number as you work out your solutions. When you actually log in to input answers, this should make the process much smoother and less prone to error. Obviously, it is of utmost importance to make sure you are entering answers in the correct tests.

*Please make notes and comments about the problems that caused difficulty so that you can recall the process you undertook when we go over the packets in the fall.

*If you encounter any typos or errors, please email me with the problem and the issue at ttoth@communityschoolnaples.org
This answer sheet is to help you organize your work. These answers must still be entered on www.classmarker.com

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## Answer Sheet
for Post Algebra I Post-tests (tests 2 and 3)

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Pretest
Test 1 Section 1

1. If \( a = 0 \) and \( b \neq 0 \), then what is the value of \( \frac{a}{b} + \frac{a+1}{b} + \frac{a-1}{b} \)?
   (A) 3   (B) 2   (C) 1   (D) \( \frac{1}{2} \)   (E) 0

2. If \( 33mn + 10 = 38mn \), then what is the value of \( mn \)?
   (A) \(-\frac{1}{2}\)   (B) 0   (C) \( \frac{1}{2} \)   (D) \( \frac{2}{3} \)   (E) 2

3. Which of the following numbers satisfy \( \frac{3}{x} - 2 = \frac{1}{x} \)?
   (A) \(-1\)   (B) 0   (C) \( \frac{1}{2} \)   (D) 1   (E) 3

4. If \( a - b = 80 \) and \( \frac{3}{5} = \frac{b}{a} \), then what is the value of \( a \)?
   (A) 240   (B) 200   (C) 120   (D) 80   (E) 5

5. If \( x \) onions cost \( r \) cents, how many onions can be bought with \( d \) dollars?
   (A) \( \frac{100d}{xr} \)   (B) \( \frac{r}{100dx} \)   (C) \( \frac{100r}{dx} \)   (D) \( \frac{100dx}{r} \)   (E) \( \frac{dx}{100r} \)

6. If \( a + b = c \) and \( a = c \), then all of the following must be true except...
   (A) \( b = 0 \)   (B) \( c - a = 0 \)   (C) \( a - b = c \)   (D) \( c - a = a - c \)   (E) \( 3b = a + 2c \)

7. If \( (y - 4)^2 = 36 \) and \( y < 0 \), what is the value of \( y \)?
   (A) 10   (B) 2   (C) \(-2\)   (D) \(-6\)   (E) \(-10\)

8. If \( v, w, x, y, \) and \( z \) are positive consecutive integers whose sum is 15, then what is the value of \( \frac{z+y}{y-v} \)?
   (A) 3   (B) 2   (C) \( \frac{4}{3} \)   (D) \( \frac{6}{5} \)   (E) \(-2\)

9. If a positive number \( n \) increased by \( r \) times that number equals that number, then what is the value of \( r \)?
   (A) \(-2\)   (B) \(-1\)   (C) 0   (D) 1   (E) 2

10. If \( 2^{3x} = 8 \), then \( x = \)
    (A) \( \frac{2}{3} \)   (B) 1   (C) \( \frac{3}{2} \)   (D) 4   (E) \( \frac{8}{3} \)
11. If \( x + y = 15 \) and \( x - y = 25 \), then what is the value of \( 2x^2 - y^2 \)?

(A) 425  (B) 775  (C) 825  (D) 1,575  (E) 1,625

12. If \( x - 5 = y \), then what is the value of \((y - x)^3\)?

(A) -125  (B) -15  (C) 15  (D) 125  (E) 625

13. If the square of a number \( N \) \((N \neq 0)\) equals \( g \) times that number, then what is that number in terms of \( g \)?

(A) \(-g\)  (B) \(-g\)  (C) \(g\)  (D) \(2g\)  (E) \(g^2\)

14. If \( x = y \) and \( m > y \), then which of the following must be true?

I. \( x < m \)
II. \( x = m \)
III. \( x > m \)

(A) I Only  (B) II Only  (C) III Only  (D) I and II  (E) II and III

15. If \( \frac{m}{n} = 5 \), then \( m^2 - 25n^2 = ? \)

(A) 25  (B) 24  (C) 0  (D) -24  (E) -25

16. If \( 1 \leq x < y \leq 8 \) and \( x \) and \( y \) are integers, what is the least possible value of \( \frac{x+y}{xy} \)?

(A) \(\frac{3}{2}\)  (B) \(\frac{9}{8}\)  (C) \(\frac{9}{14}\)  (D) \(\frac{13}{42}\)  (E) \(\frac{15}{56}\)

17. If \(-3x + 13 < -14\), then…

(A) \(x > 9\)  (B) \(x < 9\)  (C) \(x < \frac{1}{3}\)  (D) \(x < -\frac{1}{3}\)  (E) \(x < -9\)

18. If \( x > y \) and \( y > 0 \) and \( xz < 0 \), then which of the following must be true about all of the values of \( z \)?

(A) \(z > 0\)  (B) \(z = 0\)  (C) \(z < 0\)  (D) \(z > x\)  (E) \(z > y\)

19. If \( \frac{x+y}{y} = 4 \) and \( \frac{x+z}{z} = 6 \), what is the value of \( \frac{y}{z} \)?

(A) \(\frac{3}{5}\)  (B) \(\frac{2}{3}\)  (C) 1  (D) \(\frac{3}{2}\)  (E) \(\frac{5}{3}\)

20. If \( x^2 - 6x + 8 = 0 \) and \( y = x + 3 \), then what are the possible values of \( y \)?

(A) 2 and 4  (B) 2 and 5  (C) 4 and 5  (D) 4 and 7  (E) 5 and 7
Test 1 Section 2

1. If \(|3x - 3| = 6\), then the solution graphed on a number line is…

(A) \(\ldots\)  
(B) \(\ldots\)  
(C) \(\ldots\)  
(D) \(\ldots\)  
(E) \(\ldots\)

2. If it takes 10 men 4 hours to repair a barn, how long will it take 8 mean to complete the task?

(A) 2 Hours   (B) 5 Hours   (C) 6 Hours   (D) 8 Hours   (E) 10 Hours

3. If \(\frac{4}{x} = \frac{y}{5}\), what is the value of \(\frac{y}{x}\)?

(A) \(\frac{1}{20}\)  
(B) \(\frac{4}{5}\)  
(C) \(\frac{5}{4}\)  
(D) 20  
(E) Cannot be determined from the information given

4. If \(a = -2\) and \(b = 16\), then \(a^0b^2 + a^{-2}b^{-\frac{1}{2}}\) is equal to…

(A) \(-\frac{3}{16}\)  
(B) \(\frac{1}{32}\)  
(C) \(\frac{1}{16}\)  
(D) \(\frac{65}{16}\)  
(E) \(\frac{257}{32}\)

5. If \(f(x) = \frac{x^2 - 9}{x^2 - 4}\), the domain of \(x\) is all real numbers except…

(A) 2 and \(-2\)   (B) \(-3\) and \(3\)   (C) 0   (D) 2   (E) 2 and 3

6. In \(x\) years from now, Robert will be \(k\) years old. How old was Robert \(m\) years ago?

(A) \(x - (k + m)\)   (B) \(k - x\)   (C) \(k - x - m\)   (D) \(x - (k - m)\)   (E) \(k + m - x\)

7. If \(x = y\) and \(y + 2 = x^2\), then \(x\) must equal…

(A) \(-2\) Only   (B) 1 Only   (C) 2 Only   (D) \(-1\) or 2 Only   (E) \(-2\) or 1 Only

8. If \(\sqrt{2x + 7} = 13\), then the value of \(x\) equals…

(A) \(\frac{3}{2}\)  
(B) 3  
(C) 10  
(D) 18  
(E) 200
9. If \( m = (x + 3)^2 \) AND \( x = -1 \), then \( m = \)

10. George has 9 more dollars than Frank, who has 3 more than Richard. What is the least amount of money that must be exchanged so that they each have the same amount of money?

11. If \( \frac{2m+7n}{4m^2-49n^2} = 7 \), what is the value of \( 2m - 7n \)?

12. If \( x - 5y = 37 \) and \( x \) and \( y \) are positive integers, then what is the \underline{least} possible value of \( x \)?

13. If \( n - 1 = 7 \) and \( mn - m = 28 \), then \( m = \)

14. If \( x^2 + y^2 = 12 \) and \( xy = -4 \), then \( (x + y)^2 = \)

15. If \( (2x^2 + 5x - 3)(5x - 4) = ax^3 + bx^2 + cx + d \) for all real values of \( x \), what is the value of \( b \)?

16. If \( (y - 5)^2 = 0 \), then what is the value of \( (y + 3)^2(y - 10)^2 \)?

17. If \( 4a + 3b = 27 \) and \( 3a + 4b = 29 \), then \( \frac{7a+7b}{2} = \)

18. In August Amy spent \( \frac{2}{5} \) of the money in her checking account. In September she spent \( \frac{1}{3} \) of the remainder. If she had $400 left, what was in her checking
1. If \( m > 0, \) then \((-m)^5(-m)^4 =\)
   (A) \(-m^{5+4}\)  (B) \(-m^{20}\)  (C) \(-m^9\)  (D) \(m^9\)  (E) \(m^{20}\)

2. If \( \frac{m}{5} = m^2, \) then the non-zero value of \( m \) is…
   (A) 5  (B) \(-\frac{1}{5}\)  (C) 0  (D) \(\frac{1}{5}\)  (E) 5

3. If number \( K \) (\( K \neq 0 \)) equals the number squared divided by \( r \), then what is \( K \) in terms of \( r \)?
   (A) \(-r^2\)  (B) \(-r\)  (C) \(r\)  (D) \(2r\)  (E) \(r^2\)

4. If \( 4x - 3 < -9, \) when which of the following could be one solution for \( x \)?
   (A) \(-2\)  (B) \(-1\)  (C) \(3\)  (D) \(4\)  (E) \(5\)

5. If the steps below are followed in the order given, then which is the correct simplified result?
   1. Add \( 3x - 2 \) to \( 3 - 2x \)
   2. Multiply that sum by \(-1\)
   3. Subtract \( x + 2 \) from the product
   (A) \(-2x - 3\)  (B) \(-2x - 1\)  (C) \(2x - 3\)  (D) \(2x + 1\)  (E) \(2x + 3\)

6. If \( \frac{x}{x-6} = \frac{1}{x-4}, \) then \( x \) equals…
   (A) 1 and 6  (B) \(-1\) and \(-6\)  (C) \(-2\) and \(-3\)  (D) \(2\) and \(3\)  (E) \(3\) and \(-3\)

7. Sam’s parents give him extra allowance based on the number of times he walks the dog. Last week Sam
   got \$3.00 for walking the dog twice. How much extra allowance would he get for walking the dog seven times?
   (A) \$6.50  (B) \$10.00  (C) \$10.50  (D) \$14.00  (E) \$21.00

8. If \( p \left(\frac{1}{q}\right) = -1, \) then which of the following is NOT necessarily true?
   (A) \(p + q = 0\)  (B) \(p - q = 2p\)  (C) \(pq = -p^2\)  (D) \(p^2 + q^2 = 2p^2\)  (E) \(p = -\frac{1}{q}\)

9. If \( a = 1 + \frac{1}{b}, and b > 1, \) then a could equal…
   (A) \(\frac{1}{5}\)  (B) \(\frac{4}{5}\)  (C) \(\frac{8}{5}\)  (D) \(\frac{11}{5}\)  (E) \(\frac{14}{5}\)

10. If \( x - y = 7 \) and \( x^2 - y^2 = -70, \) then what is the value of \( x?\)
   (A) \(-10\)  (B) \(-6\)  (C) \(-3\)  (D) \(-\frac{3}{2}\)  (E) \(-\frac{2}{3}\)

11. If \( \frac{a}{b} = k \) and \( ab \neq 0, \) then \( \frac{a+b}{a} \) is equal to…
   (A) \(\frac{1}{k+1}\)  (B) \(\frac{k}{k+1}\)  (C) \(\frac{k+1}{k-1}\)  (D) \(\frac{k+1}{k}\)  (E) \(k + 1\)

12. A trip to Europe for a class of \( N \) students has a fixed cost of \( x \) dollars. If 5 students decide not to go,
    then how much more will it cost EACH student to take the trip?
   (A) \(\frac{x}{5}\)  (B) \(\frac{x}{N-5}\)  (C) \(\frac{x}{N} - \frac{x}{5}\)  (D) \(\frac{x}{N} - \frac{x}{N-5}\)  (E) \(\frac{x}{N-5} - \frac{x}{N}\)
13. If $6x = 8$ and $4y = 10$, then what is the value of $3(3x) - 4(2y)$?
   (A) −16    (B) −10    (C) −8    (D) 8    (E) 16

14. What is the value of $f(x) = 3^x + 3x + 3^0$ if $x = 3$?
   (A) 18    (B) 19    (C) 36    (D) 37    (E) 39

15. If $3m = 11$ and $x - 6m = 27$, what is the value of $x$?
   (A) 5    (B) 16    (C) 38    (D) 49    (E) 93
1. If \( a + 2a + 3a + 4 = a + 2a + 5 \), then what is the value of \( a \)?

2. If \( x + y = -3 \) and \( x - y = 5 \), then what is the value of \( -xy \)?

3. If \( \frac{x}{2y} = 3 \), then what is the value of \( x^2 - 36y^2 \)?

4. If the dollar value of your investment is established by the formula \( I = p + p\cdot r \cdot t \), where \( p \) is the principal, \( r \) is the investment rate expressed as a decimal, and \( t \) is the amount of time in years, what is \( I \) when \( p = 600 \), \( r = 14\% \), and \( t = 3 \) years?

5. If the sum of two numbers is 19 and their product is 90, what is the sum of their squares?

6. \((30, 30 + m, 30 + 2m, 30 + 3m, \ldots)\) In this sequence, each term is formed by adding \( m \) to the preceding term. If the sixth term in this sequence is 110, what is the value of the 11th term?

7. \((2, 10, 30, 68, 130, \ldots)\) If the \( n \)th term in this sequence above is defined as \( n^3 + n \), what is the next term in this sequence?

8. \(-1, -4, \ldots, 224\) If the \( n \)th term in the sequence given above is identified as \( N^n - 2N^2 \), what is the value of the missing term?

9. If \( \frac{3}{x} = 6 \) and \( \frac{3}{y} = 12 \), then \( x - y = \)

10. If \( nx + 7 = 8 \) while \( kx - 7 = 10 \), what is the value of \( \frac{n}{k} \)?

11. If \( a = y^2 \) and \( b = y^4 \), and \( -1 \leq y \leq 3 \), then what is the largest possible difference between \( a \) and \( b \)?

12. \( x + y = 7 \)
\[
5x + y = 27
\]
For this given system of equations, what is the value of \( xy \)?

13. If the average of a number \( N \) and its reciprocal is 1, what is the number \( N \)?
14. If \(\frac{1}{x} + \frac{1}{7} = \frac{7}{x}\), then what is the value of \(x\)?

15. If \(pg = 50\) and \(gr = 15\), then what is the value of \(g(p + r)\)?

16. What is the greatest integer \(N\) such that \((10 - N) + (16 - N) > 5\)?

17. The ratio of \(\frac{n}{m} = \frac{7}{8}\) and the ratio of \(\frac{m}{p} = \frac{4}{5}\), what is the ratio of \(\frac{n}{p}\)?

18. On a six-day vacation, Susan had a certain amount of entertainment money to spend. On Sunday, the last night of her vacation, she had $2 left. As a matter of fact, each evenings after the first she discovered that she had one-third the amount of money she had the previous evening. How much money did Susan start with?

19. If \(y = 3\) satisfies the equation \(y^2 - 7y + k = 0\), then what is another value of \(y\) that satisfies the equation?

20. If \(a\) and \(b\) are negative integers such that \(a - b = -2\), then what is the last possible value of \(ab\)?

21. What is the absolute value of the difference between the solutions of the equation \(|2 + \frac{p}{3}| = 5|\)?

22. If \(16^n = 64\), then what is the value of \(4^{-n}\)?

23. If \(\sqrt{x + 5} - 3 = 1\), then what is the value of \(x\)?

24. If \(\sqrt{4x + 3} = 3\sqrt{x - 8}\), then what is the value of \(x\)?

25. If it takes 4 people 6 hours to landscape a recreation area, how many hours will it take 3 people to complete the same task?
1. Simplify:  \( r - [1 - (-1 - 1)] \).
   (A) \( r - 3 \) \quad (B) \( r - 2 \) \quad (C) \( r - 1 \) \quad (D) \( r \) \quad (E) \( r + 1 \)

2. If \( \frac{2m}{3} > \frac{1}{3} \), then \( m \) could be what number?
   (A) \(-2\) \quad (B) \(-1\) \quad (C) \(0\) \quad (D) \(\frac{1}{2}\) \quad (E) \(1\)

3. If \( \frac{7}{1} = \frac{0.7}{x} \), then what is the value of \( x \)?
   (A) \(\frac{1}{10}\) \quad (B) \(\frac{1}{7}\) \quad (C) \(\frac{7}{10}\) \quad (D) \(\frac{10}{7}\) \quad (E) \(10\)

4. The table gives both time and temperature.
   How much higher was the temperature at 9 o’clock than 5 o’clock?
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   (A) 3.8 \quad (B) 4.1 \quad (C) 7.9 \quad (D) 10.1 \quad (E) 12.5

5. If \( a^2 + b^2 = a^2 - 2ab + b^2 \), then which of the following must be true?
   (A) \( a = 0 \) \quad (B) \( b = 0 \) \quad (C) \( a = 0 \) or \( b = 0 \) \quad (D) \( a = 0 \) and \( b = 0 \) \quad (E) Cannot be determined from the given information

6. What is the value of \((3 - \frac{1}{3})^2 - 3\)?
   (A) \(-2\frac{5}{9}\) \quad (B) \(-2\) \quad (C) \(-\frac{11}{9}\) \quad (D) \(\frac{37}{9}\) \quad (E) \(4\frac{4}{9}\)

7. A number decreased by 10 gives the same result as the number multiplied by 10. What is the number?
   (A) \(-\frac{10}{11}\) \quad (B) \(-\frac{10}{9}\) \quad (C) \(-\frac{9}{10}\) \quad (D) 0 \quad (E) 1

8. If \( n \) is a positive integer, then \( \sqrt{4n} - \sqrt{n} \) must equal…
   (A) \(\sqrt{n}\) \quad (B) \(\sqrt{2n}\) \quad (C) \(\sqrt{3n}\) \quad (D) 2 \quad (E) \(3\sqrt{n}\)

9. If \( xz + yz = z \), then what is the value of \( x + y \)?
   (A) 0 \quad (B) 1 \quad (C) 2 \quad (D) 3 \quad (E) Cannot be determined from the given information

10. If the sum of 3 unequal positive integers equals 22, what is the smallest value of the largest possible number?
11. If \( \frac{3}{5} y = 0 \), then \( \frac{3}{5} + y = \) 
   (A) \(-\frac{3}{5}\)  \(\)  (B) 0  \(\)  (C) \(\frac{3}{5}\)  \(\)  (D) 1  \(\)  (E) \(\frac{8}{5}\) 

12. If Phil will be 35 in \( x \) years, which expression represents his age 6 years ago? 
   (A) 35 \(-\) \( x \)  \(\)  (B) 29 \(-\) \( x \)  \(\)  (C) 29  \(\)  (D) \( x \) \(-\) 6  \(\)  (E) \( x \) \(-\) 29 

Questions 13 and 14 refer to the following number line:

13. Using the given number line and the points labeled a, b, c, d, and e, which answer contains the order pair \((x, y) = (\text{least value, greatest value})\)? 
   (A) \((a^2, e^2)\)  \(\)  (B) \((b^2, e^2)\)  \(\)  (C) \((c^2, e^2)\)  \(\)  (D) \((d^2, a^2)\)  \(\)  (E) \((c^2, a^2)\) 

14. Which of the following products has the greatest value? 
   (A) \(ab\)  \(\)  (B) \(ac\)  \(\)  (C) \(be\)  \(\)  (D) \(de\)  \(\)  (E) \(ae\) 

15. If \( x = 2 \) is one solution of \( x^2 + 8x - c = 0 \), then the other solution is… 
   (A) 20  \(\)  (B) 10  \(\)  (C) \(-2\)  \(\)  (D) \(-10\)  \(\)  (E) \(-20\) 

16. If \( 7 = M^a \), then which expression represents \(49M\)? 
   (A) \(M^{a+1}\)  \(\)  (B) \(M^{2a}\)  \(\)  (C) \(M^{2a+1}\)  \(\)  (D) \(M^{7a}\)  \(\)  (E) \(M^{7a+1}\) 

17. The sum of two integers is less than or equal to 48. If the larger integer is 7 times the smaller, then what is the greater possible value of their difference? 
   (A) 1  \(\)  (B) 6  \(\)  (C) 30  \(\)  (D) 36  \(\)  (E) 42 

18. If \( x^2 + 7x - 8 = 0 \) and \( y = x - 5 \), then what are the possible values of \( y \)? 
   (A) \(-8\) and 0.1  \(\)  (B) \(-8\) and \(-13\)  \(\)  (C) \(1\) and \(-4\)  \(\)  (D) \(-3\) and \(-4\)  \(\)  (E) \(-13\) and \(-4\) 

19. What is the sum of the solutions to the equation \(|-5x - 5| = 45|\)? 
   (A) \(-18\)  \(\)  (B) \(-9\)  \(\)  (C) \(-2\)  \(\)  (D) 2  \(\)  (E) 18 

20. \( x \) and \( y \) vary inversely. When \( x = 2 \), \( y = 2x \). What is the value of \( y \) when \( x = 1 \)? 
   (A) 1  \(\)  (B) 2  \(\)  (C) 8  \(\)  (D) 16  \(\)  (E) 32
1. If $\frac{3+w}{24} = \frac{2}{3}$, what is the value of $w$?
   (A) 1       (B) 5       (C) 9       (D) 13       (E) 16

2. If $-2 < 2x - 6 < 10$, then the values of $x$ that satisfy the compound inequality are…
   (A) $-2 < x < 10$    (B) $-2 < x < 8$    (C) $4 < x < 16$    (D) $2 < x < 8$    (E) $-1 < x < 8$

3. If $8^\frac{n}{2} = \frac{1}{4}$, then what is the value of $n$?
   (A) -4       (B) $-\frac{1}{2}$    (C) $-\frac{1}{4}$    (D) $\frac{1}{4}$    (E) $\frac{1}{2}$

4. If $a = b + 1$, then what is the value of $(a - b)^3 - (b - a)^3$?
   (A) -2       (B) -1       (C) 0       (D) 1       (E) 2

5. If $x + ay = N$, then $a$ must equal which of the following expressions?
   (A) $N - x - y$    (B) $\frac{N}{y} + x$    (C) $\frac{N}{y} - x$    (D) $\frac{N + x}{y}$    (E) $\frac{N - x}{y}$

6. The cost of family membership in a municipal pool is $10 for each member of the family plus $30 for a parking permit. Express this cost as a function of $p$, the number of people in a family using one car?
   (A) $f(p) = 40p$    (B) $f(p) = 10p + 30$    (C) $f(p) = 30p + 10$    (D) $f(p) = 10p + 1$    (E) $f(p) = 30p + 1$

7. If $\sqrt{x} - 5 + 4 = 6$, then what is the value of $x$?
   (A) 15       (B) 9       (C) 7       (D) 5       (E) 0

8. Solve $\frac{1}{6} - \frac{1}{2x^2} = \frac{1}{3x}$
   (B) 1 and $-2$    (B) 1 and 2    (C) 1 and $-3$    (D) $-1$ and 2    (E) $-1$ and 3

**Student-Produced Response Questions:**

9. If $v$, $w$, $x$, $y$, and $z$ are positive consecutive integers, and $v < w < x < y < z$, then what is the value of $\frac{z-v}{y-w}$?

10. If $2x - y = 210$ and $\frac{y}{x} = \frac{2}{7}$, what is the value of $y$?

11. If $\frac{1}{4}xMx\frac{4}{1}xN = 4$, then $MN =$
12. Sarah pays $96 for a dress after a 25% discount. What was the original price of the dress?

13. \( \sqrt{(183^2)} + 3(183^2) = \)

14. A number increased by 8 gives the same result as a number multiplied by 8. What is that number?

15. If \( x - y = 14 \) and \( x^2 - y^2 = 84 \), then what is the value of \( x \)?

16. What is the least integer \( N \), such that \( (11 - N) + (15 - N) < 11 \)?

17. If \( 9x^2 - y^2 = 0 \), then what is the positive value of \( \frac{x}{y} \)?

18. This fraction, \( \frac{\frac{1.5}{x} + \frac{5}{y}}{8} \), can be doubled by doubling which digit?
Test 3, Section 3

1. What percent of $\frac{3}{5}$ is $\frac{1}{5}$?
   (A) 20%    (B) 33 $\frac{1}{3}$%   (C) 40%    (D) 60%    (E) 80%

2. If $a - b = x$ and $y = -a + b$, then $x - y$ is equal to which of the following?
   (A) 0    (B) $2a$    (C) $2b$    (D) $2a - 2b$    (E) $2a + 2b$

3. If $xy < 0$, then which of the following must be true?
   (A) $x - y < 0$    (B) $x - y > 0$    (C) $x^2 - y^2 > 0$    (D) $x^2 + y^2 > 0$    (E) $\frac{x}{y} + 2 > 0$

4. If $\frac{2}{x} = 6$ and $\frac{5}{y} = 15$, then $x + y =$
   (A) $\frac{1}{5}$    (B) $\frac{2}{5}$    (C) $\frac{3}{4}$    (D) $\frac{5}{6}$    (E) 5

5. Consuela is three times as old as Mary. In 10 years she will be only twice Mary’s age. How old was Consuela 4 years ago?
   (A) 6    (B) 10    (C) 26    (D) 30    (E) 40

6. If $x^2 + x > 1$, then which of the following is always true?
   I. $x \leq -1$    II. $x > 0$    III. $x > 1$
   (B) I Only    (B) II Only    (C) III Only    (D) I and II Only    (E) I and III Only

7. Dwight buys a $125 chainsaw at a discount of 16%. What does he pay for the saw?
   (A) $41$    (B) $84$    (C) $105$    (D) $109$    (E) $116.60$

8. If $0 < N < 1$, then which of the following decreases as $N$ increases?
   (A) $N^2$    (B) $N^2 - 1$    (C) $N - 1$    (D) $\frac{1}{N}$    (E) $\sqrt{N}$

9. -2, 2, 18, 52, … If the rth term in the sequence given is defined as $r^3 - 3r$, then what is the next term in the sequence?
   (A) -2    (B) 2    (C) 18    (D) 52    (E) 110

10. If $\frac{xa}{y-a} = 1$ and $x > 0$ and $y > 0$, then which expression best represents $a$?
    (A) $\frac{y}{x+1}$    (B) $\frac{y+1}{x+1}$    (C) $\frac{x-1}{y}$    (D) $\frac{x}{y+1}$    (E) $\frac{x+1}{y}$
11. What values of $x$, on the real number line, satisfies $-2 < x + 4$ and $x + 4 \leq 5$?

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-6 -5 -4 -3 -2 -1 0 1 2 3 4 5 6
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(A) ■ ———— o
(B) o ———— ■
(C) ■ ———— ■
(D) ■ ———— o
(E) o ———— ■

12. If $10 - 4x \leq 5 + x$, then which of the following is true?

(A) $x \leq 1$  (B) $x > 1$  (C) $x \geq 1$  (D) $x \geq 3$  (E) $x \geq 5$

13. If $m(p + r) = 0$, then which of the following expressions must be true?

I. $m = 0$  II. $m = 0$, and $p = -r$  III. If $m \neq 0$, then $p = -r$

(C) I Only  (B) II Only  (C) III Only  (D) I and II Only  (E) II and III Only

14. If $f(x) = 8x^{-2} + 4x^{0} + 2x^{2}$, that is the value of $f\left(\frac{1}{2}\right)$?

(A) $4 \frac{1}{2}$  (B) $32 \frac{1}{2}$  (C) $34$  (D) $34 \frac{1}{2}$  (E) $36 \frac{1}{2}$

15. If $x^2 + y^2 = 18$ and $xy = -4$, then $(x - y)^2 =$

(A) $-72$  (B) $4$  (C) $18$  (D) $26$  (E) $36$