

Washington Latin Public Charter School
Summer Math Problem Set for Rising Pre-Calculus Students
Required of Students Enrolled in Pre-Calculus for the 2018-19 Academic Year

Name:

DIRECTIONS (please read the directions carefully):

- Please be prepared to have this problem set completed and ready to be handed in on the first day of classes in August.
- This problem set is required of all students who will be enrolled in Pre-Calculus in the fall of 2018.
- These practice problems serve as important preparation for a successful experience in Pre-Calculus.
- Please do all of the problems on your own and receive only limited assistance from other people.
- Your ability to work through these problems successfully gives us some insight into how prepared you are for a successful experience in Pre-Calculus.
- If someone else does most of the work for you, then we will not get an accurate assessment of your knowledge and abilities.
- You can complete this problem set comfortably if you work about 10 problems per day, in which case you would finish the packet in about 10 days.
- This problem set contains a total of 105 questions.
- This problem set contains three types of questions:
 - 1) True or False questions.
 - 2) Multiple Choice questions.
 - 3) Student-Generated Free-Response questions.
- You are not required to show work for the True/False and Multiple Choice questions.
- You must show your work (thought process) on the Student-Generated Free-Response Questions in order to receive credit.
- The work (steps) that you show is (are) as important as the final answer you give.
- Please write all relevant work clearly within the area provided for each question.
- Please DO NOT write work on other sheets of paper other than these pages.

Student Selected Response Section I (True or False)

1. True or False: The expression $(2x-3)^2$ simplifies to $4x^2+9$
2. True or False: The expression -6^2 is equivalent to 36
3. True or False: The expression $\sqrt{36+64}$ simplifies to 14
4. True or False: $\sqrt{3}+\sqrt{3}=\sqrt{6}$
5. True or False: $\sqrt{7}\cdot\sqrt{7}=7$
6. True or False: The two points $A(-5,7)$ and $A(5,-2)$ are the same distance from the y-axis.
7. True or False: $\sqrt{81}=\pm 9$
8. True or False: Given that $x>0$ and $y>0$, $\sqrt{x^2+y^2}=x+y$

9. True or False: Given that $x > 0$ and $y > 0$, $\sqrt{x^2 y^2} = xy$
10. True or False: Given that $x > 0$, the expression $\sqrt{18x^3} = 3x\sqrt{2x}$
11. True or False: The expression $(4x^2 y^3)^0$ is equivalent to zero.
12. True or False: Solving the equation $x^2 = 100$ results in the solution set $\{10, -10\}$
13. True or False: $\sqrt{(x-5)^2} = |x-5|$
14. True or False: $27^{\frac{2}{3}} = \sqrt[3]{27^2} = (\sqrt[3]{27})^2$
15. True or False: $\frac{6\sqrt{10}}{2} = 3\sqrt{5}$
16. True or False: Subtracting $2x-5$ from $8x+7$ results in $6x-2$

17. True or False: Every right triangle has one 90° angle and two acute angles.
18. True or False: The two acute angles in a right triangle are complimentary.
19. True or False: If the hypotenuse in a right triangle has length 13 inches and one leg has length 12 inches, then the other leg has length 5 inches.

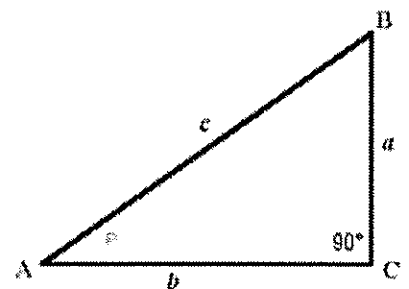
20. True or False: $40 \div 10 \cdot 2 = 8$

21. True or False: $6 - 2(5 + 3) = 32$

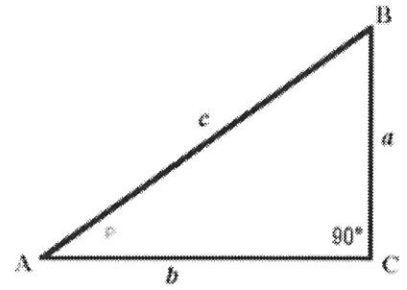
22. True or False: The expression $(-6)^2$ is equivalent to 36

23. True or False: $-2(-3)^2 = 36$

24. True or False: In the right triangle displayed to the right, the leg opposite angle A is side a.



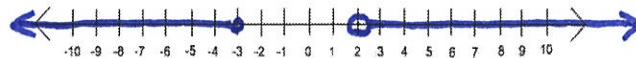
25. True or False: In the right triangle displayed to the right, the leg adjacent to angle A is side b.



Student Selected Response Section II (Multiple Choice)

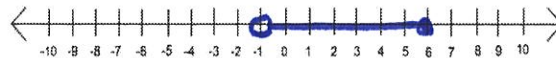
26. The set of numbers graphed on the real number line is represented by the set:

a. $(-\infty, -3] \cup [2, \infty)$ b. $[\infty, -3) \cup (2, \infty]$ c. $(-\infty, 3) \cup (2, -\infty)$ d. $(-\infty, -3] \cup (2, \infty)$



27. The set of numbers graphed on the real number line is represented by the set:

a. $-1 \geq x < 6$ b. $-1 < x \leq 6$ c. $-1 \leq x \leq 6$ d. $-1 < x > 6$ e. $-1 < x < 6$



28. Solving $3 - 2x > 11$ results in the solution set

a. $x < -4$ b. $x > -4$ c. $x < 4$ d. $x > -7$ e. $x < -7$

29. The radical expression $\sqrt{18x^{16}}$ simplifies to

a. $2x^4\sqrt{3}$ b. $3x^4\sqrt{2}$ c. $2x^8\sqrt{3}$ d. $9x^4\sqrt{2}$ e. $3x^8\sqrt{2}$

30. The radical expression $\sqrt{2} + \sqrt{50}$ simplifies to

a. $\sqrt{52}$ b. $5\sqrt{2}$ c. $2\sqrt{13}$ d. $6\sqrt{2}$ e. $\sqrt{2} + 2\sqrt{5}$

31. The expression $3^{\frac{1}{2}} \cdot 3^{\frac{1}{3}}$ simplifies to
a. $9^{\frac{5}{6}}$ b. $3^{\frac{2}{6}}$ c. $9^{\frac{2}{5}}$ d. $9^{\frac{1}{6}}$ e. $3^{\frac{5}{6}}$
32. The rational expression $\frac{x^2+16}{x-4}$ is equivalent to
a. $x-4$ b. $x+4$ c. $4x$ d. none of these
33. The rational expression $\frac{x^2+5x+14}{x+2}$ is equivalent to
a. $x+2$ b. $x+12$ c. $6x+7$ d. $x+7$ e. none of these
34. The domain of the quadratic function $f(x)=x^2-8x+12$ is
a. $x \geq 12$ b. $x \geq 4$ c. $x \leq -4$ d. $x \geq -4$ e. $(-\infty, \infty)$
35. The range of the quadratic function $f(x)=x^2-8x+12$ is
a. $x \geq 12$ b. $x \geq 4$ c. $x \leq -4$ d. $x \geq -4$ e. $(-\infty, \infty)$
36. If a line has a slope of zero, then the line is
a. vertical b. slant or oblique c. horizontal d. undefined
37. If a line has an undefined slope, then the line is
a. vertical b. non-horizontal/non-vertical c. horizontal d. undefined
38. Solving the equation $3x-7=5x+9$ results in the solution
a. $x=8$ b. $x=-1$ c. $x=1$ d. $x=-8$ e. $x=2$

39. The binomial $x^2 + 25$ factors as

- a. $(x+5)(x+5)$ b. $(x-5)(x-5)$ c. $(x+5)(x-5)$ d. does not factor

For the #'s 40-42, refer to triangle ABC below. Determine each of the following trigonometric ratios:

40. $\sin A =$

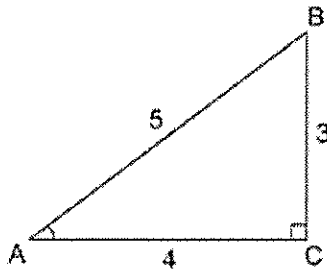
- a. $\frac{4}{5}$ b. $\frac{3}{4}$ c. $\frac{5}{3}$ d. $\frac{5}{4}$ e. $\frac{3}{5}$

41. $\cos B =$

- a. $\frac{3}{4}$ b. $\frac{3}{5}$ c. $\frac{5}{4}$ d. $\frac{5}{3}$ e. $\frac{4}{5}$

42. $\tan A =$

- a. $\frac{5}{4}$ b. $\frac{3}{5}$ c. $\frac{3}{4}$ d. $\frac{5}{3}$ e. $\frac{4}{5}$



43. The fraction $\frac{8}{2^{-1}}$ is equivalent to

- a. 64 b. $\frac{2}{8}$ c. $\frac{8}{2}$ d. 16 e. none of these

44. The graph of the parabola with equation $f(x) = (x-4)^2 + 6$ has a vertex with coordinates
- a. $(-4, 6)$ b. $(-4, -6)$ c. $(4, 6)$ d. $(4, -6)$
45. The graph of the quadratic function $f(x) = 2(x+3)^2 - 1$ has an axis of symmetry with equation
- a. $x = 3$ b. $x = -3$ c. $x = 2$ d. $x = -1$
46. The minimum value of the quadratic function $f(x) = \frac{1}{2}(x-6)^2 + 3$ is
- a. $y = \frac{1}{2}$ b. $y = 6$ c. $y = -3$ d. $y = 3$
47. The minimum value of the quadratic function $f(x) = 2x^2 + 4x - 1$ is
- a. $y = \frac{1}{2}$ b. $y = 6$ c. $y = -3$ d. $y = 3$
48. Given the quadratic function $f(x) = x^2 + 4x - 5$, identify the values of x for which $f(x) < 0$
49. Given the quadratic function $f(x) = x^2 + 4x - 5$, identify the values of x for which $f(x) > 0$
50. Solving the compound inequality $-11 < 3x - 8 < 7$ results in the solution set
- a. $-5 < x < 1$ b. $-1 < x < 5$ c. $x < -5$ or $x > 1$ d. $x < -1$ or $x > 5$

51. The point or ordered pair $P(-3,4)$ is located in quadrant
a. *I* b. *II* c. *III* d. *IV*
52. The point or ordered pair $K(3,-4)$ is located in quadrant
a. *I* b. *II* c. *III* d. *IV*
53. The slope of the line containing two points $A(-1,4)$ and $B(3,7)$ is
a. $m = \frac{4}{3}$ b. $m = \frac{-4}{3}$ c. $m = \frac{-3}{4}$ d. $m = \frac{3}{4}$
54. Simplifying the algebraic expression $(4xy^4)^3$ results in
a. $4x^3y^{12}$ b. $12x^3y^{12}$ c. $64x^3y^{12}$ d. $64x^4y^7$
55. The absolute value expression $|7-15|$ simplifies to
a. 22 b. -22 c. -8 d. 8
56. The slope of the graph of the linear function $2x-3y=12$ is
a. $\frac{2}{3}$ b. $\frac{-3}{2}$ c. $\frac{-2}{3}$ d. $\frac{3}{2}$
57. Factoring the polynomial $x^2+20x+36$ results in
a. $(x+1)(x+36)$ b. $(x+2)(x+18)$ c. $(x+3)(x+12)$ d. $(x+4)(x+9)$

Student Generated Free Response Section

58. Determine the number that is 17 more than the quotient of 56 and 8.

59. What is the x-coordinate of every point on the y-axis?

60. Write $\frac{101}{15}$ as a mixed number.

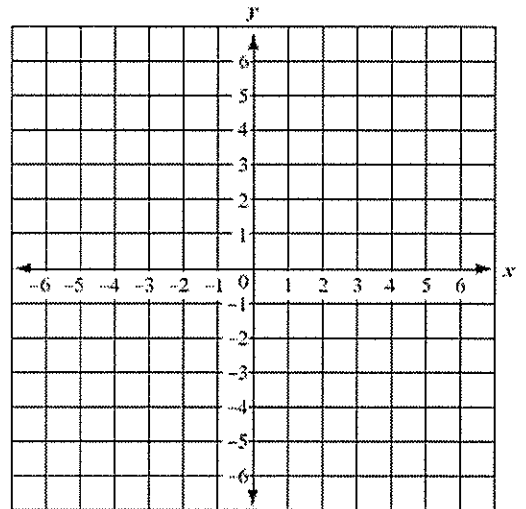
61. Divide and reduce $\frac{56}{85} + \frac{14}{17}$

62. Add and reduce $\frac{11}{30} + \frac{13}{50}$

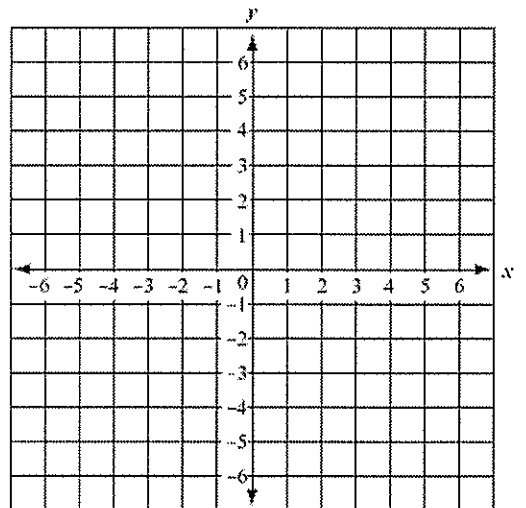
63. Determine the number that is 11 less than the difference of 37 and -5 .

64. Write the coordinates of the y-intercept of the graph of the linear function $f(x) = -2x + 8$. Show work neatly.
65. Write the coordinates of the x-intercept of the graph of the linear function $f(x) = -2x + 8$. Show work neatly.
66. Write the coordinates of the y-intercept of the graph of the linear function $-3x + 4y = -8$. Show work neatly.
67. Write an equation of the line with slope $m = \frac{-3}{5}$ and y-intercept coordinates $(0, 6)$.
68. Determine the slope of the line containing the two points $A(8, 1)$ and $B(8, -6)$.
69. Show the prime factorization of 210

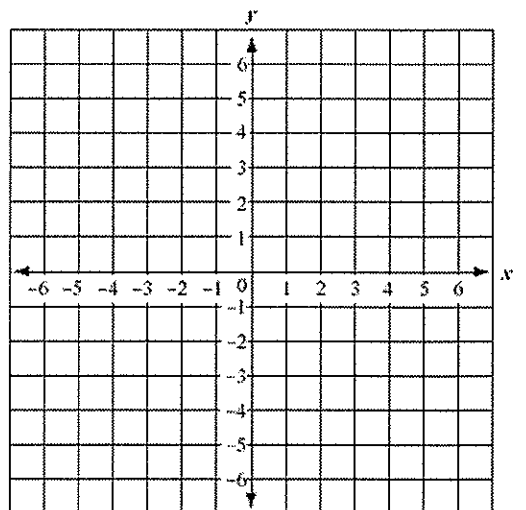
70. Write an equation of the line containing the two points $(-6, -11)$ and $(3, 4)$.



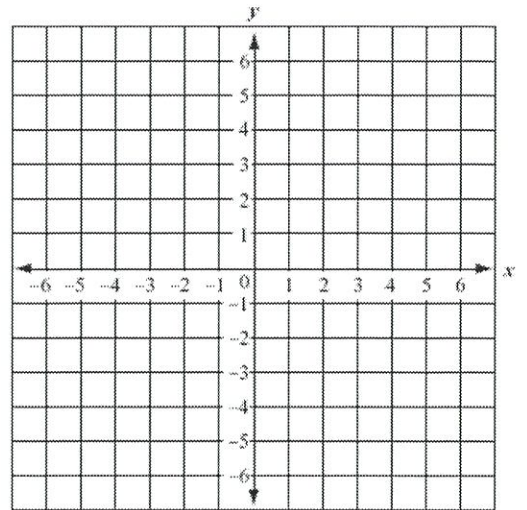
71. Graph the line with equation $y = -2x + 3$.



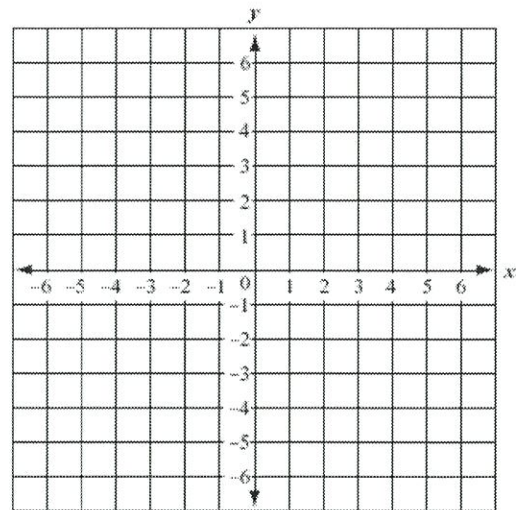
72. Graph the line with equation $5x - 3y = 15$.



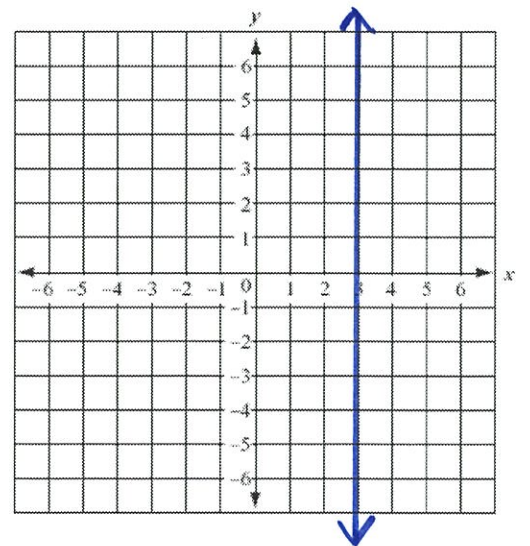
73. Graph the line with equation $y = -3$.



74. Graph the line with equation $y = x$.



75. Write an equation of the line graphed to the right.



76. Write the coordinates of the y-intercept of the graph of the quadratic function

$$f(x) = x^2 - 8x + 9. \text{ Show work neatly.}$$

77. Write the coordinates of the vertex of the graph of the quadratic function

$$f(x) = x^2 - 8x + 9. \text{ Show work neatly.}$$

78. Convert the quadratic function $f(x) = 2(x-3)^2 - 5$ from vertex form to standard form

$$f(x) = ax^2 + bx + c.$$

79. Simplify the product of 56 and $\frac{9}{8}$

80. Write the linear equation $y = \frac{5}{3}x - 2$ in standard form $ax + by = c$.

81. Simplify the algebraic expression $(5xy^3)(4x^2y^3)$

82. Simplify the algebraic expression $9x^2y^3 - 4x^2y^3$

83. Simplify the algebraic expression $x^3 - 3x^2 + 4x - 6 + 3x^3 - 3x^2 - 9x + 1$

84. Simplify the algebraic expression $(x^3 - 3x^2 + 4x - 6) - (3x^3 - 3x^2 - 9x + 1)$

85. Simplify the algebraic expression $3(2x - 1) + 2(4x + 5)$

86. Simplify the algebraic expression $x^2(2x - 1) + x(4x + 5)$

87. Factor the polynomial $3x^2 + 15x + 18$ by factoring out the greatest common factor.

88. Factor the polynomial $2x^3 + 14x^2 + 20x$ by factoring out the greatest common factor.

89. Factor the polynomial $3x^2 - 11x - 20$

90. Factor the polynomial completely $3x^3 + 5x^2 - 12x - 20$

91. Simplify the expression $\frac{x}{8} - \frac{x-16}{8}$

92. Simplify the expression $\frac{a+1}{7} - \frac{a}{6}$

93. Simplify the expression $\frac{3}{4x} - \frac{5}{x^2}$

94. Simplify the expression $\frac{x^2-25}{x^2-10x+25}$

95. Simplify the expression $\frac{x+7}{x^2+10x+21} \times \frac{x^2-2x-15}{x-5}$

96. Simplify the expression $\frac{x^2-16}{x-4} \div \frac{x^2+12x+32}{x+8}$

97. Solve the equation $x^2=100$

98. Solve the equation $x^2+13x+36=0$ by factoring.

99. Solve the equation $x^2 - 16x - 36 = 0$ by factoring.

100. Solve the equation $x^2 - 64 = 0$ by factoring.

101. Use the quadratic formula $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$ to solve the equation $x^2 - 6x + 4 = 0$

102. Simplify (reduce) the expression $\frac{42x^7y^5}{14x^2y^9}$

103. Simplify (reduce) the expression $\frac{17x^4}{85x^{-2}}$

104. Rationalize the denominator in the fraction $\frac{18}{\sqrt{3}}$

105. You invest \$1,000 in an interest bearing savings account with an annual interest rate of 3.25% compounded monthly. Determine the value of this investment in 10 years. Show your work neatly.