Washington Latin Public Charter School
Summer Math Problem Set for Rising Pre-Calculus Students
Required of Students Enrolled in Pre-Calculus for the upcoming 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.

Section I - Student Selected Response (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 points $A(-5,7)$ and $A(5,-2)$ are the same distance from the y-axis.

7. True or False: $\dfrac{3}{-2x+1}=\dfrac{-3}{2x-1}$

8. True or False: $\sqrt{81}=\pm 9$

9. True or False: Given that $x>0$ and $y>0$, $\sqrt{x^2+y^2}=x+y$

10. True or False: Given that $x>0$ and $y>0$, $\sqrt{x^2y^2}=xy$

11. True or False: Given that $x>0$, the expression $\sqrt{18x^3}=3x\sqrt{2x}$

12. True or False: The expression $\left(4x^2y^3\right)^0$ is equivalent to zero.

13. True or False: Solving the equation $x^2=100$ results in the solution set $\{10,-10\}$

14. True or False: $\sqrt{(x-5)^2}=|x-5|$

15. True or False: $27^{\frac{2}{3}}=\sqrt[3]{27^2}=\left(\sqrt[3]{27}\right)^2$

16. True or False: $\frac{6\sqrt{10}}{2}=3\sqrt{5}$

17. True or False: Subtracting $2x-5$ from $8x+7$ results in $6x-2$

18. True or False: Every right triangle has one 90° angle and two acute angles.

19. True or False: The two acute angles in a right triangle are complimentary.

20. 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.

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

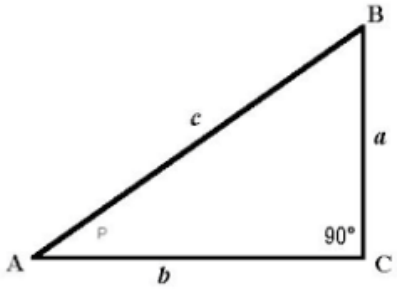
22. True or False: $6 - 2(5+3) = 32$

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

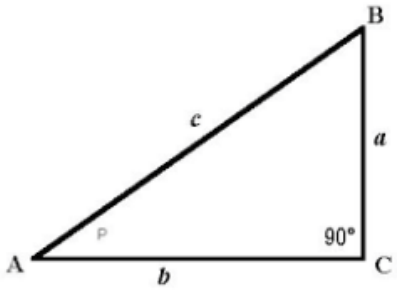
24. True or False: $-2(-3)^2 = 36$

25. True or False: $\frac{6}{0} = 0$

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

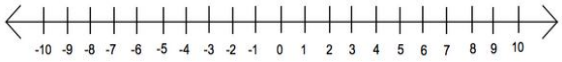


27. True or False: In the right triangle displayed to the right, the leg adjacent to angle A is side b.



Section II - Student Selected Response (Multiple Choice)

28. 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. $(-\infty,-3]\cup(2,\infty)$



29. 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. $-1<x<6$

30. Solving $3-2x>11$ results in the solution set
    a. $x<-4$ b. $x>-4$ c. $x<4$ d. $x>-7$ e. $x<-7$

31. 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. $3x^8\sqrt{2}$

32. 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. $\sqrt{2}+2\sqrt{5}$

33. 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. $3^{\frac{5}{6}}$

34. The rational expression $\frac{x^2+16}{x-4}$ is equivalent to

a. $x-4$ b. $x+4$ c. $4x$ d. none of these

35. 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

36. 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. $(-\infty,\infty)$

37. The range of the quadratic function $f(x)=x^2-8x+12$ is

a. $y\geq 12$ b. $y\geq 4$ c. $y\leq -4$ d. $y\geq -4$ e. $(-\infty,\infty)$

38. If a line has a slope of zero, then the line is

a. vertical b. slant or oblique c. horizontal d. undefined

39. If a line has an undefined slope, then the line is

a. vertical b. non-horizontal/non-vertical c. horizontal d. undefined

40. Solving the equation $3x-7=5x+9$ results in the solution

a. $x=8$ b. $x=-1$ c. $x=1$ d. $x=-8$ e. $x=2$

41. 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 41-43 , refer to triangle ABC below. Determine each of the following trigonometric ratios:

42. $\sin A=$

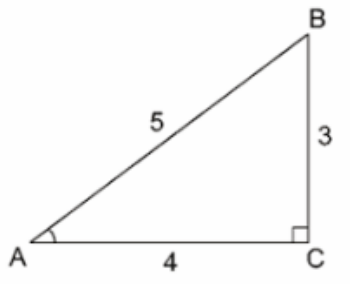
a. $\frac{4}{5}$ b. $\frac{3}{4}$ c. $\frac{5}{3}$ d. $\frac{5}{4}$ e. $\frac{3}{5}$

43. $\cos B=$

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

44. $\tan A=$

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



45. 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

46. 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. $(4,-6)$

47. 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. $x=-1$

48. 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. $y=3$

49. 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. $y=3$

50. Given the quadratic function $f(x)=x^2+4x-5$, identify the values of x for which $f(x)<0$

a. $-5<x<1$ b. $-1<x<5$ c. $x<-5$ *or* $x>1$ d. $x<-1$ *or* $x>5$

51. Given the quadratic function $f(x)=x^2+4x-5$, identify the values of x for which $f(x)>0$

a. $-5<x<1$ b. $-1<x<5$ c. $x<-5$ *or* $x>1$ d. $x<-1$ *or* $x>5$

52. Solving the compound inequality $-11<3x-8<7$ results in the solution set

a. $-5<x<1$ b. $-1<x<5$ c. $x<-5 \text{ or } x>1$ d. $x<-1 \text{ or } x>5$

53. The point or ordered pair $P(-3,4)$ is located in quadrant

a. *I* b. *II* c. *III* d. *IV*

54. The point or ordered pair $K(3,-4)$ is located in quadrant

a. *I* b. *II* c. *III* d. *IV*

55. 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. $m=\frac{3}{4}$

56. Simplifying the algebraic expression $(4xy^4)^3$ results in

a. $4x^3y^{12}$ b. $12x^3y^{12}$ c. $64x^3y^{12}$ d. $64x^4y^7$

57. The absolute value expression $|7-15|$ simplifies to

a. 22 b. –22 c. –8 d. 8

58. 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. $\frac{3}{2}$

59. 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

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

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

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

63. Divide and reduce $\frac{56}{85} \div \frac{14}{17}$

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

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

66. Write the coordinates of the y-intercept of the graph of the linear function $f(x)=-2x+8$ Show work neatly.

67. Write the coordinates of the x-intercept of the graph of the linear function $f(x)=-2x+8$ Show work neatly.

68. Write the coordinates of the y-intercept of the graph of the linear function $-3x+4y=-8$. Show work neatly.

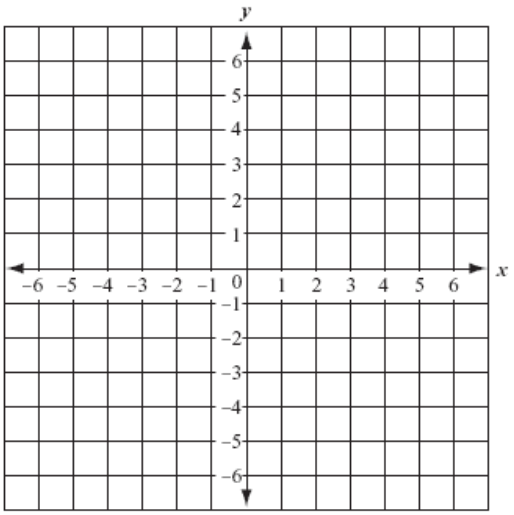
69. Write an equation of the line with slope $m=\frac{-3}{5}$ and y-intercept coordinates $(0,6)$.

70. Determine the slope of the line containing the two points $A(8,1)$ and $B(8,-6)$.

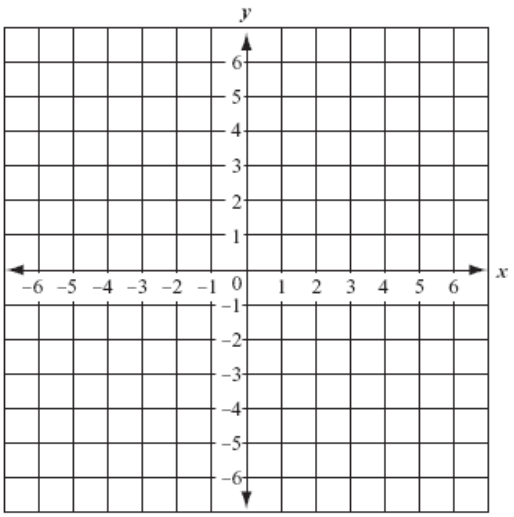
71. Show the prime factorization of 210

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

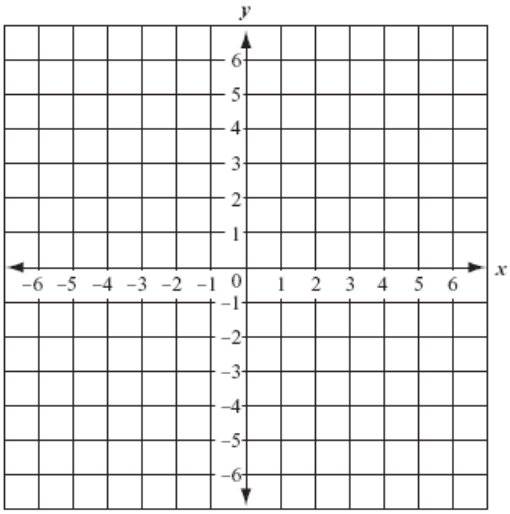
73. Graph the line with equation $y=-2x+3$.



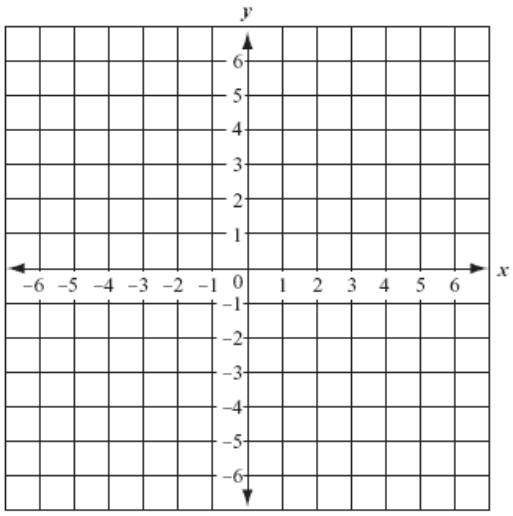
74. Graph the line with equation $5x-3y=15$.



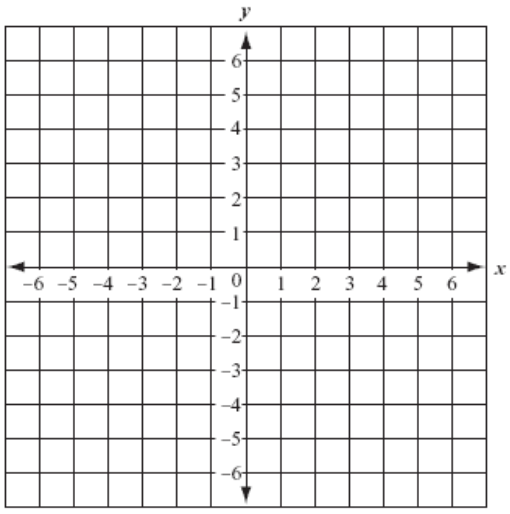
75. Graph the line with equation $y = -3$.



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



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



78. Write the coordinates of the y-intercept of the graph of the quadratic function $f(x)=x^2-8x+9$. Show work neatly.

79. Write the coordinates of the vertex of the graph of the quadratic function $f(x)=x^2-8x+9$. Show work neatly.

80. Convert the quadratic function $f(x)=2(x-3)^2-5$ from vertex form to standard form $f(x)=ax^2+bx+c$.

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

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

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

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

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

86. Simplify the algebraic expression $\left(x^3 - 3x^2 + 4x - 6\right) - \left(3x^3 - 3x^2 - 9x + 1\right)$

87. Simplify the algebraic expression $3\left(2x - 1\right) + 2\left(4x + 5\right)$

88. Simplify the algebraic expression $x^2\left(2x - 1\right) + x\left(4x + 5\right)$

89. Factor the polynomial $3x^2 + 15x + 18$ completely.

90. Factor the polynomial $2x^3+14x^2+20x$ completely.

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

107. 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.