General Math Summer Review Packet

DUE THE FIRST DAY OF SCHOOL

The problems in this packet are designed to help you review topics from previous mathematics courses that are essential to your success in Statistics. **You are expected to bring this completed packet to class on the first day of school.** In addition, this packet will count as part of your first quarter grade. **Upon returning, you will be ASSESSED on the content of this packet**. All contents outlined in the packet are Integrated Math I objectives. Neatly **SHOW YOUR WORK** on a separate sheet of paper.

Solve the equation.

1. $5x + 14 - 2x = 9 - (4x + 2)$
2. $3x + 17 - 5x = 12 - (6x + 3)$
3. $-\frac{21x}{7} - 5x = 24$
4. $\frac{9x}{3} + 11x = 28$
5. $\frac{1}{2}(y + 1) = 9$
6. $5n - 2(2 - n) = -7$
7. $\frac{1}{4}(y + 3) = 7$
8. $\frac{1}{4}(3y + 2) = 7$
9. You and your brother are raking leaves. You estimate that you can rake all the leaves in 5 hours, and your brother estimates that he can rake all the leaves in 7 hours. About how long will it take you to rake all the leaves working together?
10. Determine whether the relation is a function.
(0, 4), (1, 4), (2, 5), (3, 6), (4, 6)

Tell whether the function is linear. Then evaluate the function when $x = -6$.

11. $f(x) = 3x + 4$
12. $f(x) = 5|2x|$
13. Find the slope of the line passing through the points (7, –4) and (–6, –7).

14. Tell whether **Line 1** and **Line 2** are *parallel*, *perpendicular*, or *neither*.
Line 1 passes through (10, 7) and (13, 9)
Line 2 passes through (–4, 3) and (–1, 5)

15. Line 1 contains (2, 4) and (0, –2). Line 2 contains (–1, –3) and (1, 3). Are the lines parallel, perpendicular, or neither?

16. Line 1 contains (–3, 5) and (2, 0). Line 2 contains (1, –3) and (–1, 3). Are the lines parallel, perpendicular, or neither?

Graph the equation.

17. $y = 1$

18. Graph the equation $y = \frac{1}{3}x + 1$.

19. Graph the equation $y = -\frac{2}{3}x - 2$.

20. Find the slope and *y*-intercept of the graph of $3x - 7y = 42$.

Write an equation of the line with the given slope and *y*-intercept. Express your answer in slope-intercept form.

21. slope = –6; *y*-intercept = 12

22. A rental car costs $25 plus a fixed charge per mile driven. The total charge for 210 miles of use was $67. Write an equation for the cost, *C* (in dollars), in terms of the miles driven, *x*.

23. A rental car costs a minimum charge plus a fixed charge per mile driven. One customer was charged $60 for 160 miles of use. Another customer drove 280 miles and paid $90. Write an equation relating the total cost, *C* (in dollars), to the miles driven, *x*.

Solve the linear system.

24. $4x + 5y = 6$
$3x - 5y = 22$

25. $y = -\frac{3}{4}x + \frac{1}{4}$
$y = \frac{3}{4}x - \frac{3}{4}$

26. Ace Rent a Car charges a flat fee of $15 and $0.24 a mile for their cars. Acme Rent a Car charges a flat fee of $30 and $0.16 a mile for their cars. Use the following model to find out after how many miles Ace Rent a Car becomes more expensive than Acme Rent a Car.
$c = 15 + 0.24m$ Ace
$c = 30 + 0.16m$ Acme

Solve the system of equations.

27. $x + y + z = -5$
$-2x - y + z = -1$
$x - 2y - z = 0$

28. $2x + y + 3z = 6$
$x + y - 3z = 4$
$7x + 5y - 3z = 24$

True or False:

29. The solution of a system of three equations in three variables can be a plane.

30. Find $A + B$.
$A = \begin{bmatrix} -8 & -8 & -2 \\ 2 & -3 & 9 \end{bmatrix}$ $B = \begin{bmatrix} 5 & 8 & -4 \\ 0 & 1 & -9 \end{bmatrix}$

Perform the indicated matrix operation, if possible.

31. $\begin{bmatrix} 2 & 0 & 7 \\ 1 & -3 & 4 \\ -3 & 2 & 4 \end{bmatrix} + \begin{bmatrix} 1 & 9 & -1 \\ 4 & -3 & 2 \\ 6 & -5 & 1 \end{bmatrix}$

Find the difference of the matrices.

32. $\begin{bmatrix} 8 & -12 \\ 7 & -2 \end{bmatrix} - \begin{bmatrix} -3 & -5 \\ -4 & 2 \end{bmatrix}$

Perform the matrix operation, if possible.

33. $\begin{bmatrix} 2 & -1 & 2 \end{bmatrix} \begin{bmatrix} -2 \\ 4 \\ 6 \end{bmatrix}$

Is the product of the following pair of matrices defined? Write *Yes* or *No*. If yes, give the dimensions of the product matrix.

34. $\begin{bmatrix} 5 & 4 & 9 \\ 3 & 1 & 6 \end{bmatrix} \begin{bmatrix} 0 & 3 \\ 1 & 5 \\ 7 & 4 \end{bmatrix}$

Use matrices *A* and *B* to evaluate the matrix expression.

$A = \begin{bmatrix} 5 & -3 \\ 7 & 2 \end{bmatrix} \quad B = \begin{bmatrix} -2 & 7 \\ -5 & 1 \end{bmatrix}$

35. $-2(A + B)$

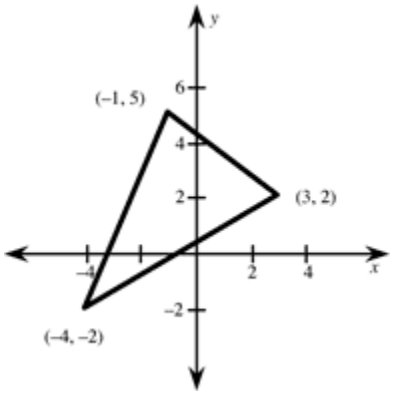
Evaluate the determinant of the matrix.

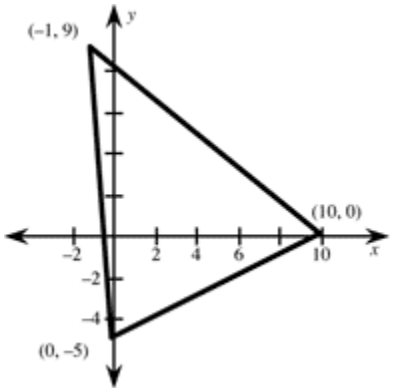
36. $\begin{bmatrix} 2 & 0 & -5 \\ 3 & 3 & 1 \\ -2 & 4 & 1 \end{bmatrix}$

37. $\begin{bmatrix} 3 & 4 \\ 2 & 6 \end{bmatrix}$

Find the area of the triangle.

38.



39. 

Use Cramer's Rule to solve the linear system.

40. $5x + 4y = 0$
$6x + 5y = -2$

41. $3x - 5y = -2$
$4x + 3y = 5$

42. Walt has three investments totaling $120,000. These investments earn interest at 4%, 6%, and 8% respectively. Walt's total income from these investments is $7600. The income from the 8% investment exceeds the total income from the other two investments by $400. Find how much Walt has invested at 8%.

Find the inverse of the matrix.

43. $\begin{bmatrix} 5 & 7 \\ 9 & 3 \end{bmatrix}$

44. $\begin{bmatrix} 4 & 7 \\ 9 & 8 \end{bmatrix}$

Find the product.

45. $(4x-1)\left(3x^2-2x-4\right)$

46. $(x+1)(2x-1)(x+3)$

47. Evaluate $\sqrt[4]{768}$ using a calculator. Round the result to three decimal places.

48. Rewrite $11^{1/4}$ using radical notation.

Evaluate:

49. $16^{5/4}$

50. The volume of a dodecahedron (a solid with 12 regular pentagons as faces) is $V \approx 7.66312a^3$, where *a* is the length of an edge. Find the edge length of a dodecahedron whose volume is 1000 cubic centimeters.

51. The volume of a dodecahedron (a solid with 12 regular pentagons as faces) is $V \approx 7.66312a^3$, where *a* is the length of an edge. Find the edge length of a dodecahedron whose volume is 975 cubic inches.

Simplify:

52. $\dfrac{25^{1/6}}{25^{2/3}}$

53. $(5^{4/5} \cdot 5^{4/5})^{-10}$

Simplify:

54. $x^{1/3} \cdot x^{1/4}$

55. Perform the indicated operation. Assume *x* is positive.

$5\sqrt[3]{64x^7} - x\sqrt[3]{8x^4}$

56. What is the value of $125^{-1/3}$?

Simplify the expression.

57. $4\sqrt[5]{5} + 8\sqrt[5]{5}$

58. $\frac{3}{5}\sqrt[5]{8} + \frac{1}{5}\sqrt[5]{8}$

Simplify the expression. Assume all variables are positive.

59. $(x^{2/3}y)^{1/2}$

60. The area of a circular park is 2×10^4 square feet. The radius *r* (in feet) can be approximated by the model $r = \left(\dfrac{A}{\pi}\right)^{1/2}$ where *A* is the area of the park (in square feet). Approximate the radius of the park. Use 3.14 for π. Round your answer to the nearest whole number.

61. Let $f(x) = 16 - x^2$ and $g(x) = 4 - x$. Find $f(x) - g(x)$.

62. Let $f(x) = 1 - x^2$ and $g(x) = 1 - x$. Find $f(x) \cdot g(x)$.

Let $f(x) = 1 - x^2$ and $g(x) = \frac{1}{x}$. Find the indicated value.

63. $f(f(3))$

64. Find the inverse of the relation (1, 7), (2, 5), (3, 3), (4, 1).

65. Sketch the graph of the function $f(x) = -x^2 - 1$. Is the inverse of $f(x)$ a function?

Solve the equation. Check for extraneous solutions.

66. $\sqrt[3]{x-5} = -3$

67. $\sqrt[3]{y-2} = 5$

68. Solve $\sqrt[3]{3x-1} = 2$.

69. Solve $\sqrt{2x+1} = \sqrt{5-x} + 2$. Check for extraneous solutions.

70. Evaluate without using a calculator. $\log_7 \frac{1}{49}$

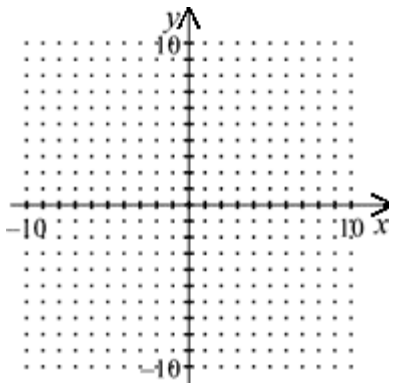
71. Evaluate without using a calculator. $\log_7 343$

Find the inverse of the function.

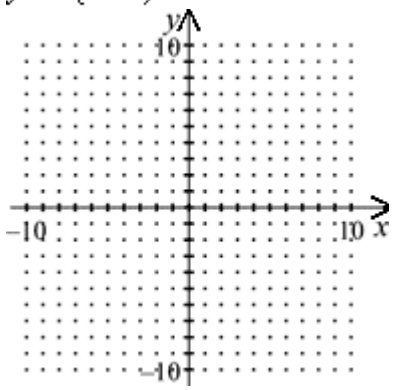
72. $y = e^{x-1}$

Graph the function. State the domain and range.

73. $y = \ln x + 4$



74. $y = \ln(x + 2)$



75. Write an exponential function of the form $y = ab^x$ whose graph passes through the given points. (4, 8), (7, 9)

76. Write an exponential function whose graph passes through the points (–1, 1.5) and (4, 48).

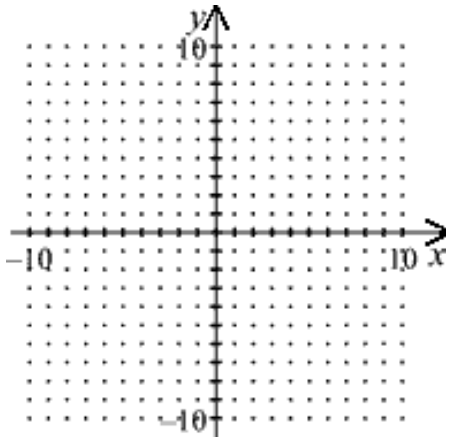
Sketch the graph of the function. Include any vertical or horizontal asymptotes.

77. $f(x) = \dfrac{4 - 2x}{x - 3}$

78. $f(x) = \dfrac{3x + 2}{x + 2}$

Graph the function.

79. $f(x) = \dfrac{x^2}{x^2 - 9}$



Identify all vertical and horizontal asymptote(s) of the graph of the function.

80. $f(x) = \dfrac{-x^3}{x^3 - 8}$

Find the vertical asymptote(s) of the graph of the function and describe the end behavior of using infinity notation.

81. $g(x) = \dfrac{x^4}{3x^2 - 10x - 8}$

Simplify the rational expression, if possible.

82. $\dfrac{x^2 - 2x - 3}{x^2 - 1}$

83. $\dfrac{x^3 + 4x^2}{x^2 - 16}$

Multiply the expressions. Simplify the result.

84. $\dfrac{(x+2)^2}{x-5} \cdot \dfrac{x^2 - 2x}{x^2 - 4}$

85. $\dfrac{2x-3}{(x+3)^2} \cdot \dfrac{x^2 + 4x + 3}{4x^2 - 9}$

86. $\dfrac{x^2 + 4x}{x^2 - 6x + 8} \cdot \dfrac{x^2 - x - 2}{3x^3 + 12x^2}$

Divide the expressions. Simplify the result.

87. $\dfrac{2k^4}{4z^3} \div \dfrac{k^8}{z^5}$

88. $\dfrac{\left(xy^2\right)^2}{\left(2xy\right)^3} \div \dfrac{x^2y^4}{(4x)^2y^3}$

Perform the indicated operation(s) and simplify.

89. $\dfrac{-3x-7}{-20x} + \dfrac{x+7}{-20x}$

90. $\dfrac{-5x}{y^4z^5} + \dfrac{3}{y^2z^3}$

Simplify the complex fraction.

91. $\dfrac{\dfrac{2}{x+2} - \dfrac{3}{x}}{\dfrac{3}{x+2} + \dfrac{2}{x}}$

Solve the equation. Check for extraneous solutions.

92. $\dfrac{4}{j-1} - \dfrac{1}{j-3} = 0$

93. $\dfrac{1}{a^2-9} = \dfrac{1}{a+3}$

94. $\dfrac{x}{2} + \dfrac{1}{15} = \dfrac{1}{30x}$

95. $\dfrac{x}{30} - \dfrac{1}{5x} = \dfrac{1}{6}$

Determine whether the given value is a solution of the equation.

96. $\dfrac{4x}{x+2} = 1 - \dfrac{8}{x+2}$; $x = -2$

97. $\dfrac{4x}{x+2} = 4 - \dfrac{8}{x+2}$; $x = 2$

98. Identify the focus and directrix of the parabola given by $y^2 = -4x$.

99. Identify the focus and the directrix of the parabola given by $y^2 + 5x = 0$.

100. Sketch the graph of the parabola.
$y^2 - 8x = 0$

101. Write the standard form of the equation of the parabola with its vertex at (0, 0) and focus at $(-3,\ 0)$.

102. Write the standard form of the equation of the circle that passes through the point (1, –6) with its center at the origin.

Evaluate without using a calculator.

103. $\cos 60°$

Use a calculator. Round to three decimal places.

104. $\cos 12°$

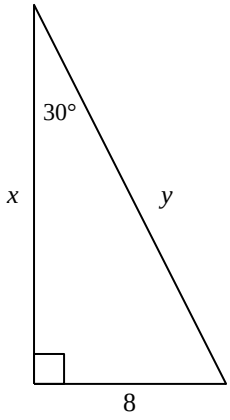
105. $\sec 27°$

106. $\cos 80°$

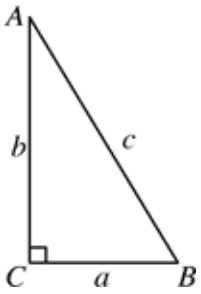
107. $\sin 69°$

Find the values of *x* and *y*.

108.



109. Solve ΔABC using the diagram and the given measurements. (The triangle is not drawn to scale.)
$B = 42°$, $a = 17$

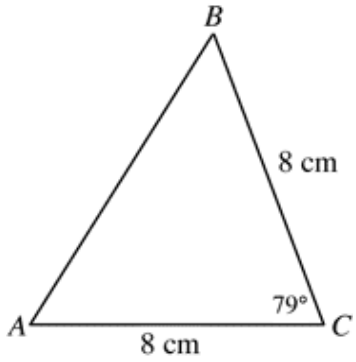


110. A ladder 12 feet long makes an angle of 67° with the ground as it leans against a store. How far up the side of the store does the ladder reach?

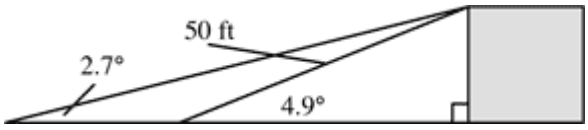
111. You are flying a kite and want to know its angle of elevation. The string on the kite is 39 meters long and the kite is level with the top of a building that you know is 24 meters high. Use an inverse trigonometric function to find the angle of elevation of the kite.

112. Given triangle *ABC* with $a = 10$, $b = 13$, and $A = 19°$, find c. Round your answer to two decimal places.

113. Find the area of ΔABC. The figure is not drawn to scale.

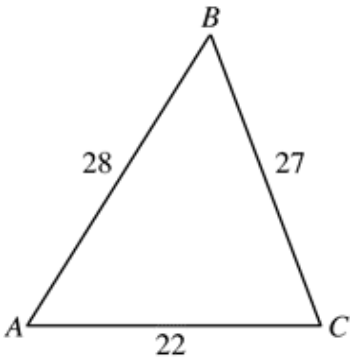


A 50-foot ramp makes an angle of $4.9°$ with the horizontal. To meet new accessibility guidelines, a new ramp must be built so it makes an angle of $2.7°$ with the horizontal.

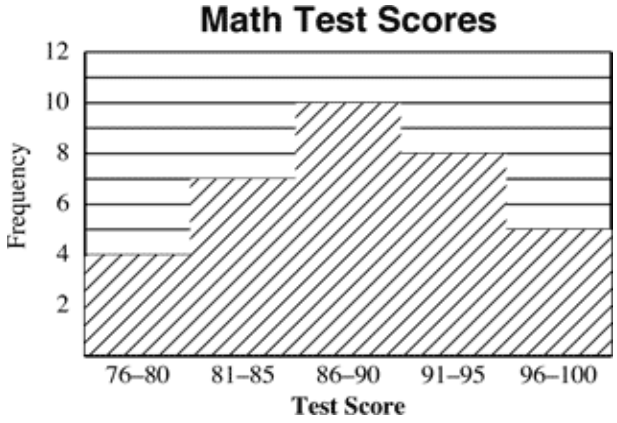


114. What will be the length of the new ramp?

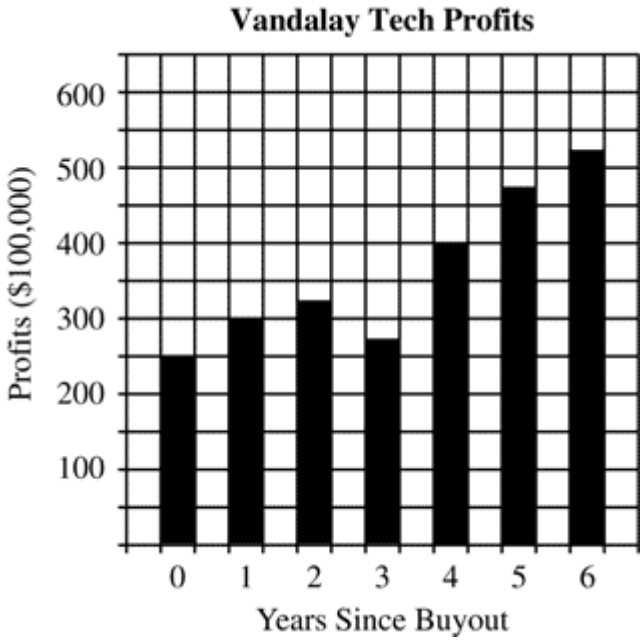
115. Find the area of ΔABC using Heron's formula.



116. The test scores for the 34 members of a math class are represented in the histogram. How many students had scores between 81 and 95?



117. Seven years ago, Vandalay Tech borrowed money and bought a competing company. At the time, critics said that borrowing the money for the buyout would have a negative impact on Vandalay's profit, and might even cause it to go bankrupt. The graph below shows the net profits declared by Vandalay since the buyout of its competitor.



How do the profits in year 6 compare to the profits in year 0 (the year of the buyout)? Did the buy-out have a negative impact on Vandalay's profit? Explain.

Solve the equation.

118. $j + 7 = 39$

119. $4.36 + b = 10.2$

120. The Coombs traveled 475.4 miles on vacation. At the end of the trip, the odometer read 50,376.4 miles. What did the odometer read at the beginning of the trip? Write a verbal model. Then write and solve an algebraic model for the problem.

Solve the equation. Check your solution.

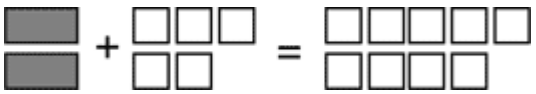
121. $3x = -27$

Solve the equation. Check your answer.

122. $6x + 7 = 55$

Use variables and symbols to write the equation modeled with the algebra tiles. Solve the equation.

123.



124. The Fahrenheit and Celsius scales are related by the equation $F = \frac{9}{5}C + 32$. What temperature Celsius would give the body temperature of 98.6ºF?

125. The charge for mailing a first-class letter to Canada using the United States Postal Service is $C = 0.31x + 0.38$ where C is the charge in dollars and x is the weight of the letter in ounces.
a. Find the charge to mail a letter that weighs 6 ounces.
b. How many ounces can be mailed for $2.86?

Translate the statement into an equation. Then solve the equation.

126. The difference of 3 and 8 times a number is –29.

127. The sum of 2 and 7 times a number is –5.

128. Write an equation that can be used to represent the sentence "When a number is divided by 3, and the quotient is then decreased by 3, the result is 5."

Simplify the product.

129. $2m^2 \cdot 2^3 m^4$

Determine the number that correctly completes the equation.

130. $7^? \cdot 7^6 = 7^{14}$