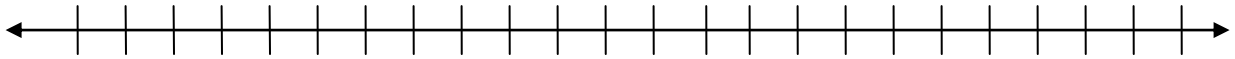
Entering PreCalculus Summer Packet

Name _____

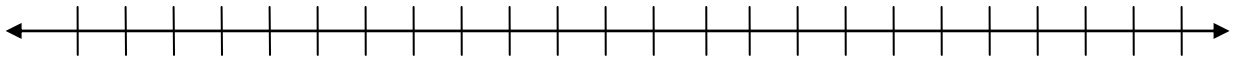
This assignment will be graded on completion as well as accuracy and will count as your first TEST grade. All work must be shown to receive full credit. Write your answers in the space provided. These problems are reflective of the knowledge that is prerequisite to the PreCalculus course.

Sketch each subset on the real number line.

1. $x \leq 5$



2. $[4, \infty)$



3. $0 < x \leq 6$

Use interval notation to describe the set.

_____4. y is no more than 25

_____5. t is at least 10 and at most 22

_____6. k is less than 5 but no less than –3

Evaluate the expression for the given value of x.

_____7. $x^2 - 3x + 4$; $x = -2$

_____8. $-3x^3$; $x = 2$

_____9. $-3x^4$; $x = -2$

Simplify each expression. Each answer should only have positive exponents (no negative exponents).

_____10. $(-z)^3(3z^4)$

_____11. $\frac{7x^2}{x^3}$

_____12. $(-2x^2)^3(4x^3)^{-1}$

_____13. $\left(\frac{x^{-3}y^4}{5}\right)^{-3}$

_____14. $(5x^2z^6)^3(5x^2z^6)^{-3}$

Evaluate each expression without a calculator.

_____15. $27^{\frac{1}{3}}$

_____16. $\left(\frac{16}{81}\right)^{-\frac{3}{4}}$

Simplify each radical expression. Rationalize the denominator of any fractions. Leave answer in simplified radical form (no decimals).

_____17. $\sqrt{54xy^4}$

_____18. $\sqrt[5]{160x^8z^4}$

_____19. $2\sqrt{50}+12\sqrt{8}$

_____20. $\frac{5}{\sqrt{14}-2}$

_____21. $\frac{8}{\sqrt[3]{2}}$

Find the product.

_____22. $(3x - 5)(2x + 1)$

_____23. $(2x - y)^3$

_____24. $(u + 2)(u - 2)(u^2 + 4)$

Perform the multiplication or division and simplify.

_____25. $\frac{t^2 - t - 6}{t^2 + 6t + 9} \cdot \frac{t + 3}{t^2 - 4}$

_____26. $\frac{x^2 - 36}{x} \div \frac{x^3 - 6x^2}{x^2 + x}$

Perform the addition or subtraction and simplify.

_____27. $\dfrac{3}{x-2}+\dfrac{5}{2-x}$

_____28. $\dfrac{2}{x^2+1}+\dfrac{1}{x^3+x}-\dfrac{1}{x}$

Simplify the complex fraction.

_____29. $\dfrac{\left(\dfrac{x}{2}-1\right)}{(x-2)}$

_____30. $\dfrac{\left(\sqrt{x}-\dfrac{1}{2\sqrt{x}}\right)}{\sqrt{x}}$

_____31. $\dfrac{\left[\dfrac{x^2}{(x+1)^2}\right]}{\left[\dfrac{x}{(x+1)^3}\right]}$

_____32. $\dfrac{1+\dfrac{1}{x}}{1-\dfrac{1}{x^2}}$

Completely factor the expression.

_____33. $2x^3 - 6x$

_____34. $16x^2 - \frac{1}{9}$

_____35. $3x^2 - 5x + 2$

_____36. $6x^3 - 2x + 3x^2 - 1$

_____37. $\frac{1}{81}x^4 - \frac{2}{9}x^2 - 8$

Write the rational expression in simplest form.

_____38. $\frac{15x^2}{10x}$

_____39. $\frac{4y - 8y^2}{10y - 5}$

_____40. $\frac{x^3 + 5x^2 + 6x}{x^2 - 4}$

Solve the quadratic equation by factoring.

_____41. $x^2 - 12x + 35 = 0$

_____42. $2x^2 = 19x + 33$

Solve the quadratic equation by completing the square.

_____43. $x^2 + 4x - 32 = 0$

_____44. $4x^2 - 4x - 15 = 0$

Use the Quadratic Formula to solve the equation.

_____45. $2 + 2x - x^2 = 0$

_____46. $8t = 5 + 2t^2$

Solve using the square root method.

_____47. $9x^2 = 36$

_____48. $(2x - 1)^2 = 18$

Find all real solutions of the equation. Check your solutions in the original equation.

_____49. $x^4 - 81 = 0$

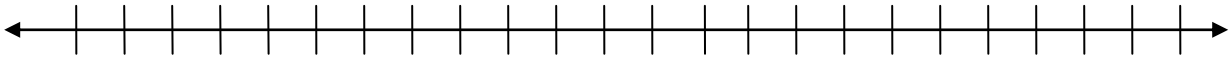
_____50. $x^3 - 3x^2 - x + 3 = 0$

_____51. $\sqrt{2x} - 10 = 0$

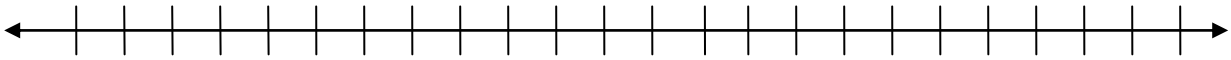
_____52. $|2x - 1| = 5$

Solve the inequality and sketch the solution on the real number line. (some inequalities have no solutions)

_____53. $-2x > -3$

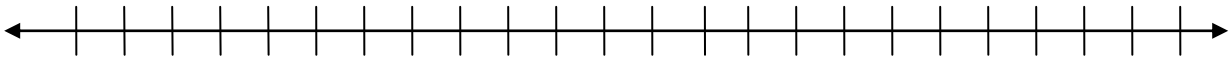


_____54. $\frac{1}{2}(8x+1) \geq 3x + \frac{5}{2}$

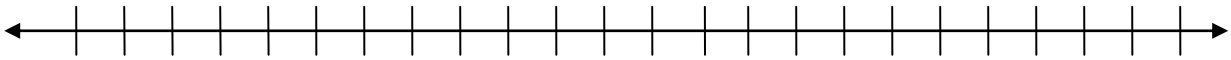


_____55. $-8 \leq 1 - 3(x-2) < 13$

_____56. $|x-5| < -1$



_____57. $\left|\frac{x-3}{2}\right| \geq 4$



Solve for the indicated variable.

_____58. Solve $A = \frac{5}{2}(b - 20)$ for b

_____59. Solve $p = \frac{(3q - 20)}{4}$ for q

_____60. Solve $\frac{pc}{x} = \frac{c}{p}$ for x

Logarithms and Exponents. Solve for x.

_____61. $\log_x 81 = 4$

_____62. $\log_3 x = 5$

_____63. $2^x = 8$

_____64. Write $3^x = 27$ in logarithmic form.

_____65. Convert $\log_{25} 5 = \frac{1}{2}$ to an exponential equation.

Evaluate the function at each specified value of the independent variable and simplify.

$h(t) = t^2 - 2t$

_____66. $h(2)$

_____67. $h\left(\frac{3}{2}\right)$

_____68. $h(x+2)$

Check for symmetry with respect to both axes and the origin. Answer Yes or No.

69. $y = 2x^3$ x-axis: _____

y-axis: _____

origin: _____

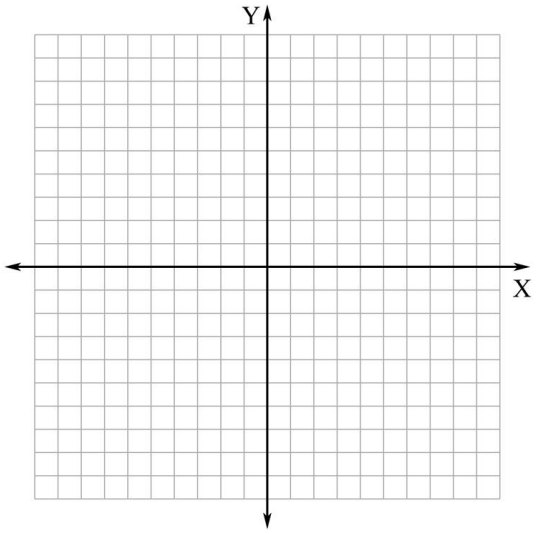
70. $x - y^2 = 1$ x-axis: _____

y-axis: _____

origin: _____

Plot the points. Find the distance between the two points and the midpoint of the line segment between the two points. Leave answer in simplified radical form (no decimals).

71. $A\left(\frac{1}{2},1\right), B\left(-\frac{5}{2},3\right)$ Distance = _____ Midpoint = _____



Find the second endpoint of a line segment if the coordinates of the first endpoint and midpoint are, respectively:

_____72. (1,– 2), (4,– 1)

Find the domain of the function and write answer in interval notation.

_____73. $f(t) = \sqrt[3]{t+4}$

_____74. $s(y) = \frac{3y}{y+5}$

_____75. $f(x) = \frac{\sqrt{x+6}}{6+x}$

Find the x and y intercepts.

76. $y = 16 - 4x^2$ x-intercept(s): _____

y-intercept(s): _____

77. $y = x^3 - 4x$ x-intercept(s): _____

y-intercept(s): _____

Solve the system of equations.

_____78. $2r + s = 11$
$6r - 2s = -2$

_____79. $4x - 5y = 17$
$3x + 4y = 5$

_____80. Find the slope of the line passing through points $(-2,0)$ and $(3,1)$.

_____81. Find the equation of the line passing through the point $(2, -1)$ and parallel to the line $2x - 3y = 5$. Write in slope-intercept form.

_____82. Find the equation of the line passing through the point (– 3,2) and perpendicular to the line x + y = 7. Write in slope-intercept form.

_____83. Find the equation of the line passing through the points (– 4, – 4) and (4,3). Write in slope-intercept form.

For each problem, write an equation and solve.

_____84. The measure of an angle is 8 degrees less than three times the measure of the angle's supplement. Find the measure of the angle.

_____85. A rectangle has a perimeter of 26 meters. If the length is 4 meters longer than twice the width, find the length and the width.

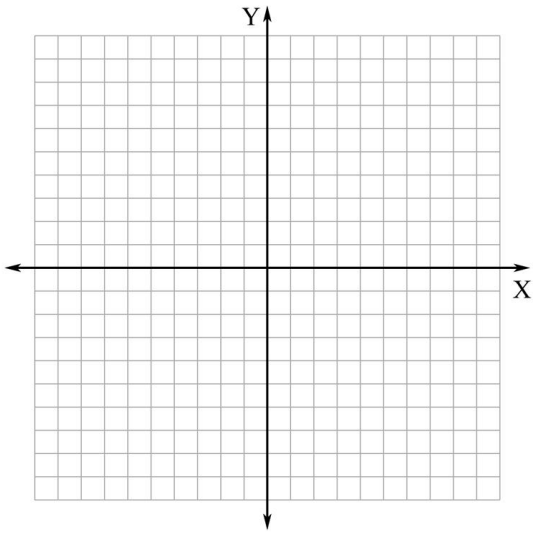
_____86. Find two consecutive odd integers whose product is 195.

_____87. The Lance Company has 78 female employees, which represents 52% of the total work force of the company. How many employees does the company have?

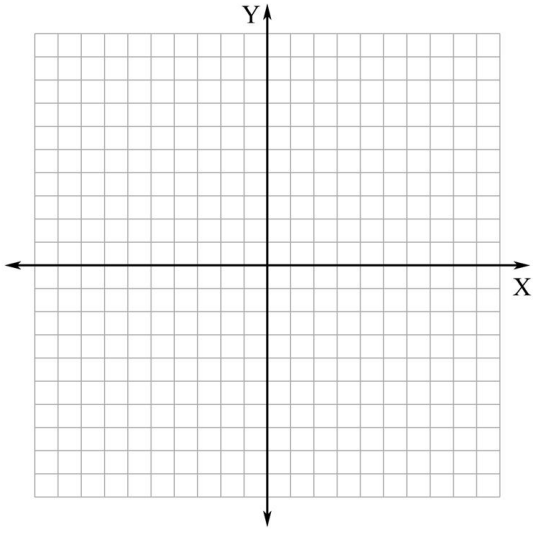
_____88. An airplane flies from Naples, Italy in a straight line to Rome, Italy, which is 120 km north and 150 km west of Naples. How far does the plane fly?(round answer to nearest tenth km)

Graph each of the following lines:

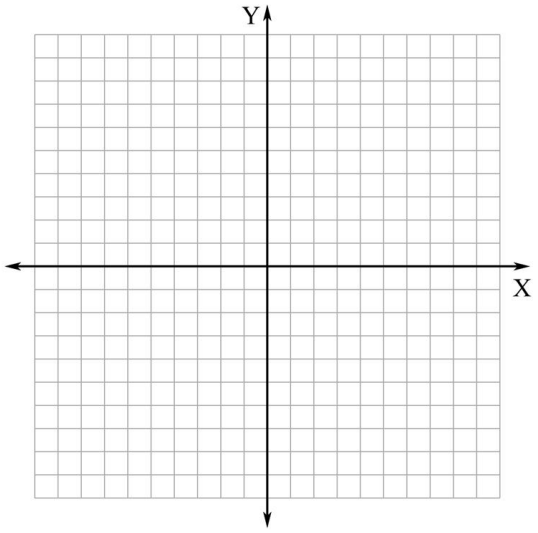
89. $y = \frac{1}{2}x + 1$



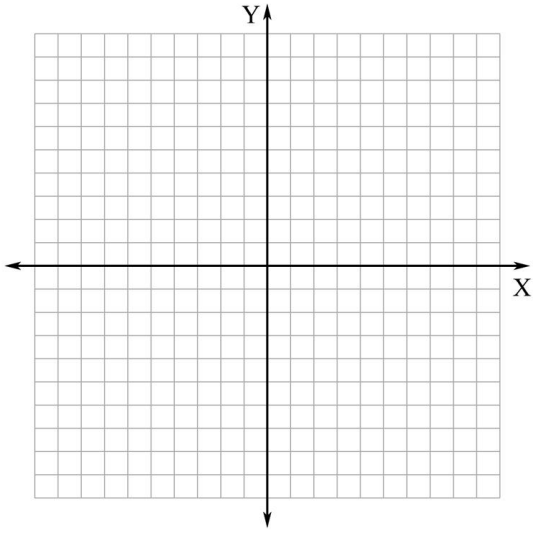
90. $5 - y = 3x$



91. A line passing through the point (6,– 1) with an undefined slope.

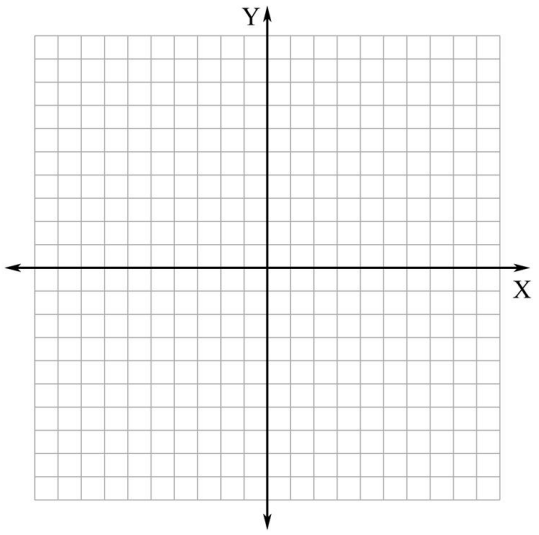


92. $y + 3 = 0$



Graph each of the following inequalities. Remember to shade.

93. $y \leq \frac{1}{3}x + 5$



94. $x - 3y < 9$
$2x + y \geq -4$