

Directions: Answer every question in this packet. Show all your work.

Factor each of the following polynomials completely. If the polynomial cannot be factor state that it is “prime”.

1. $x^3 + x^2 + x$

2. $60x^2y - 48xy^2 + 72x^3y$

3. $36x^2 - 9$

4. $32x^2 - 50y^2$

5. $x^2 + 6x + 9$

6. $x^3 + 27$ _

7. $8a^3 - 125$

8. $x^4 + 81x^2$

9. $x^2 - 17x + 16$

10. $3x^2 + 10x + 8$

11. $3z^2 - 5z + 3$

12. $x^3 + 2x^2 - x - 2$

13. $r^2 + 4r + 4 - s^2$

14. $(x-1)^2 - 2(x-1)$

15. $x^4 - 6x^2 + 9$

16. $x^6 - 64$

Solve each of the following quadratic equations by factoring.

17. $x^2 + 2x + 1 = 81$

18. $3y^2 + 8y = 12y + 15$

19. $16(p-1) = p(p+8)$

20. $(m+2)(2m+3) = (m+2)^2$

Solve each of the following equations by completing the square.

21. $x^2 + 10x - 4 = 0$

22. $2x^2 + 3x - 17 = 0$

23. $2x^2 - 5x - 12 = 0$

24. $n^2 - 7n = 2$

Solve each of the following equations using the quadratic formula.

25. $4x^2 + 4x = 15$

26. $3x^2 + 8x + 2 = 0$

27. $\frac{8}{x-2} + \frac{8}{x+2} = 3$

28. $\frac{2x-1}{5} - \frac{2}{x} = \frac{x}{2}$

Simplify each of the following expressions.

29. $\sqrt{\frac{49}{121}}$

30. $\sqrt[3]{-0.125}$

31. $\sqrt[4]{(-13)^4}$

32. $\sqrt{10} \cdot \sqrt{15}$

33. $\sqrt{\frac{4a^4}{9b^3}}$

34. $\sqrt{2x^2 - 12x + 18}$

35. $\sqrt[3]{250} - \sqrt[3]{128} + \sqrt[3]{16}$

36. $(\sqrt{3} + 2)(\sqrt{3} - 2)$

37. $(2\sqrt{3} + 5)(4\sqrt{3} - 3)$

38. $\sqrt{27} + \sqrt{45} - 2\sqrt{3} + 2\sqrt{5}$

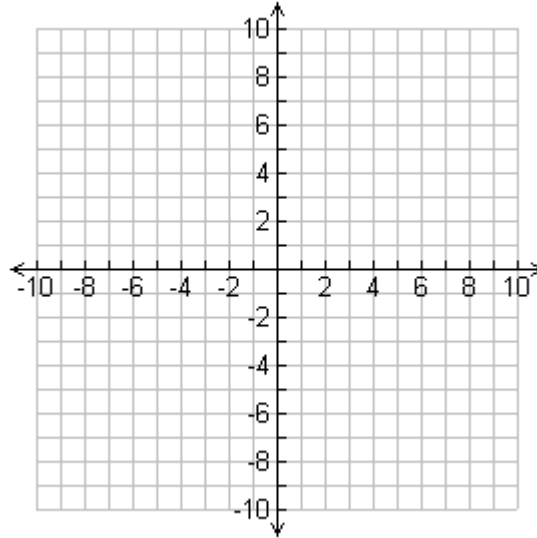
39. $\frac{6}{\sqrt{3}}$

40. $\sqrt{\frac{5}{7}}$

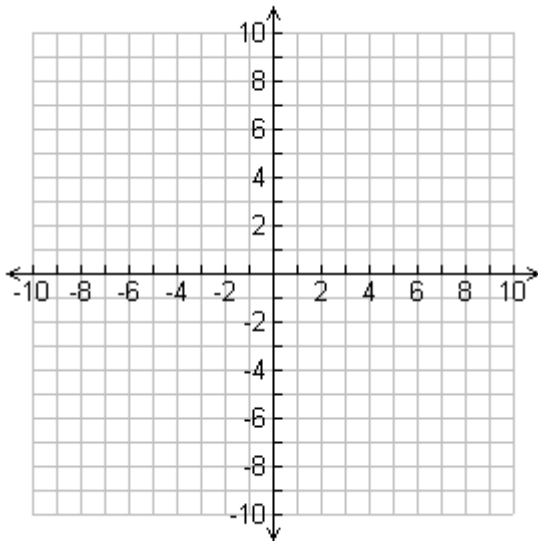
41. $\frac{5 - \sqrt{2}}{5 + \sqrt{2}}$

42. Given the equation $3x - 2y = 6$. Complete the chart below then use the points to graph the equation.

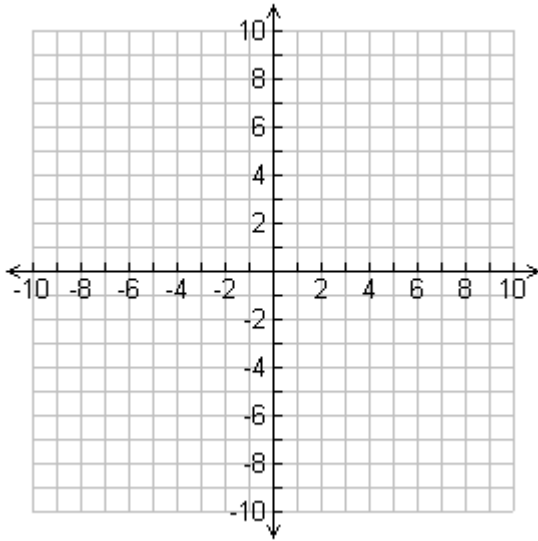
x	y
-2	
0	
2	



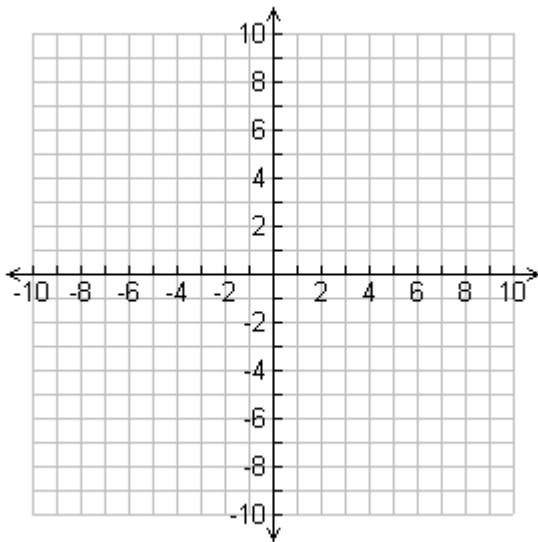
43. Graph the equation $y = -\frac{2}{3}x - 4$.



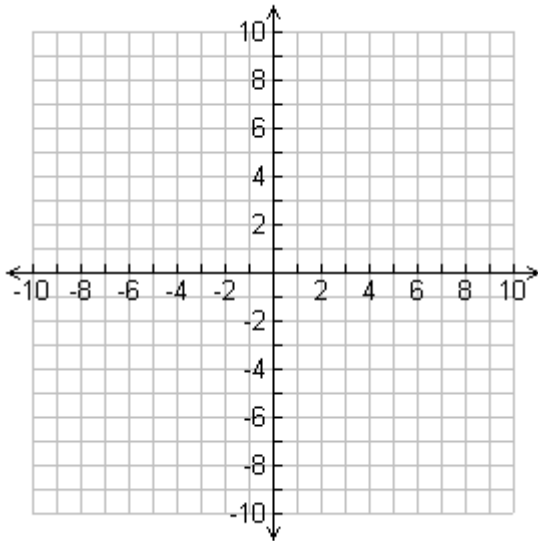
44. Graph the equation $x - 3y = 9$.



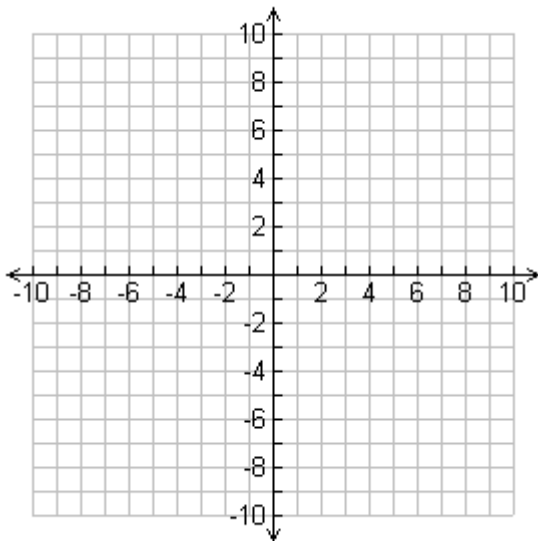
45. Find the equation of the axis of symmetry, the coordinates of the vertex, and the x- and y-intercepts of the function $f(x) = x^2 - 6x - 4$ then sketch the graph of the function using the information found.



46. Given the function $g(x) = 2(x-1)^2 - 4$.
- Determine the equation of the axis of symmetry.
 - Determine the coordinates of the vertex.
 - State whether the vertex is a maximum or minimum
 - Determine the x – and y – intercepts.
 - Sketch the graph of $g(x)$ using the above information.



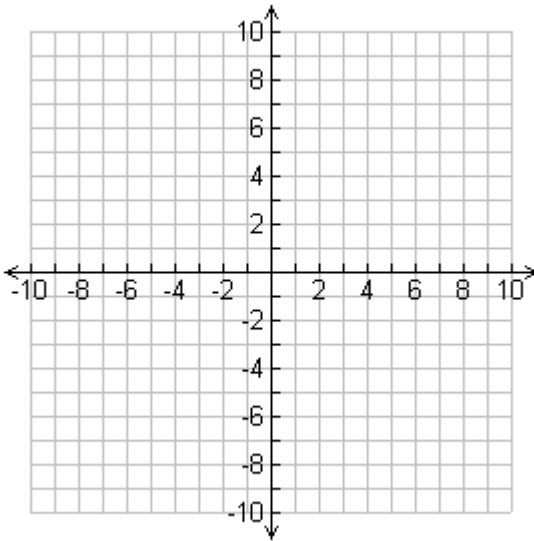
47. Show that points $A(-2, 0)$, $B(-4, 4)$ and $C(8, 5)$ are the vertices of a right triangle.
then find the area of the triangle.



48. A rectangle has a length 4 cm greater than the width and the perimeter is 32 cm. Find the area of the rectangle.

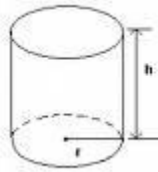
49. A farmer has 1000 feet of fencing and wishes to enclose a rectangular garden. Find the dimensions of the garden that would maximize its area.

50. Three of the four vertices of the square ABCD are A(-5, 1), B(-1, 4), and C(-1, -2).
a. Find the coordinates of the vertex D.
b. Find the area of the square.



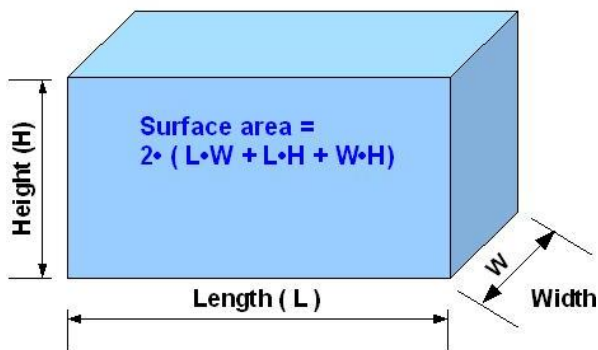
51. A circle has an area of 24 m^2 . Find the length of the radius and the length of the diameter,

52. A right circular cylinder has a height that is twice the radius of the base. The height of the cylinder is 24 inches.
- Find the volume of the cylinder and state the units of the volume.
 - Find the surface area of the cylinder and state the units of the area.



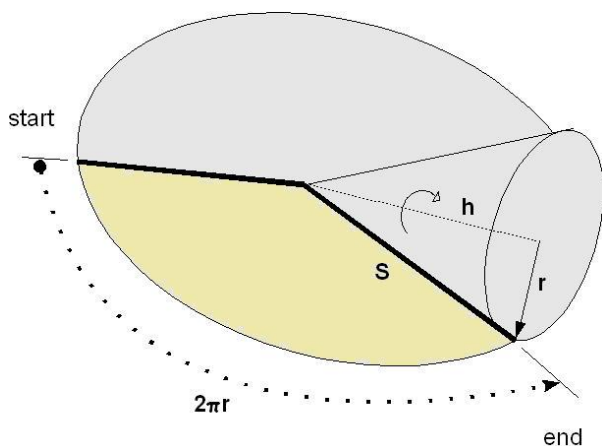
53. The width and height of the box shown below are equal and the length of the box is 4 more than the width. The surface area of the box is 102 cm^2 ,
- Find the dimensions of the box.
 - Find the volume of the box.

Box, (cuboid, right parallelepiped)



54. A sector of a circle with radius (s) of 12 feet has a central angle of 120° . The sector of the circle is rolled to form a right circular cone (see the figure below). Find the volume of the cone.

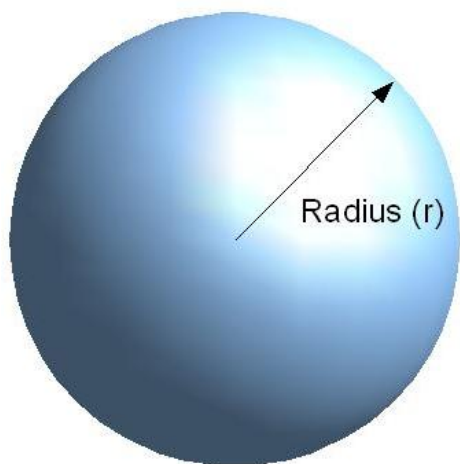
Note: You must find the formula for the volume of a right circular cone.



55. The volume of a sphere is $36\pi \text{ cm}^3$. Find the surface area of the sphere. State the units of the surface area.

Note: You must find the formula for the volume of a sphere.

Sphere



$$\text{Surface area} = 4 \cdot \pi \cdot r^2$$

(56 – 62) Find the equation of the line having the given characteristics. Express your answer using either general form or slope-intercept form of a line, whichever you prefer.

56. Slope = -2; contains the point (3, -1)

57. Slope = 0; contains the point (2, 4)

58. Slope is undefined; contains the point (-6, 1)

59. Contains the point (-4, 2) and (5, -1).

60. y-intercept = 3; x-intercept = -4

61. Parallel to the line with equation $2x - 4y = 6$ and contains the point $(5, -3)$

62. Perpendicular to the line $y = -\frac{3}{2}x + 1$ and has the same y-intercept as the line whose equation is $2x - 3y = 12$,