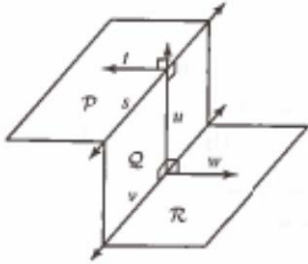


**Math 3301 Foundations of Geometry**  
**Unit IV Practice Test**

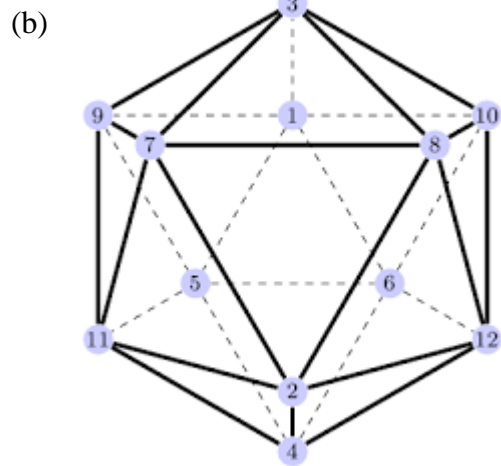
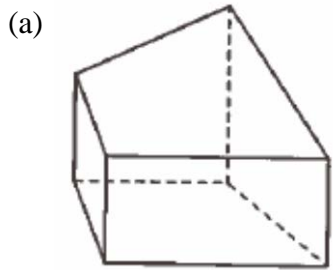
Name \_\_\_\_\_

1. In the figure, line  $s$  is the intersection of planes  $P$  and  $Q$ , and line  $v$  is the intersection of planes  $Q$  and  $R$ . Line  $t$  is in  $P$ , line  $u$  is in  $R$ ,  $t \perp u$ ,  $u \perp s$ ,  $u \perp v$ , and  $u \perp w$ . Use this information to answer true or false.

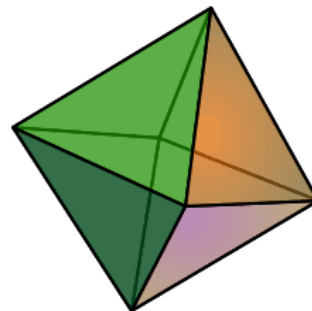


- (a)  $s \parallel R$                       (b)  $P \parallel R$                       (c)  $Q \perp P$

2. Determine the number of faces,  $f$ , vertices,  $v$ , and edges,  $e$ , in each polyhedron. Check to see that  $f + v - e = 2$ .



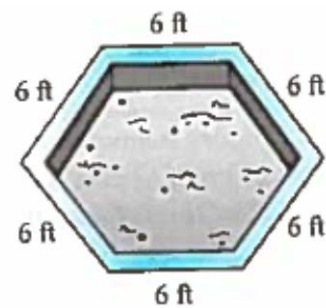
3. The edges of a regular octahedron are to be constructed with tubing that costs \$1.65 per foot. If each edge is 2.5 ft in length, how much will all the tubing required for the project cost?



4. Find the surface area of the right prism with rectangular base with sides 9.6 ft and 5.8 ft and with height 2.6 ft.

5. Find the volume of the cube with edge 18.6 cm.

6. Samuel is building a flower bed in the shape of a regular hexagon. Each side of the bed is 6 ft long, and it is 6 inches deep. How much dirt will be needed to fill the flower bed to the top of the border?



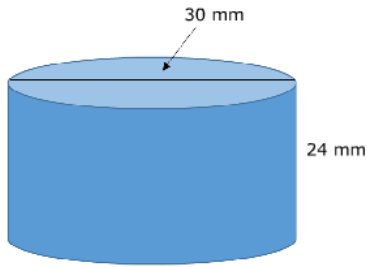
7. Find the lateral area of the regular pyramid with equilateral triangle base with side 251 cm and slant height 314 cm.

8. Find the volume of the regular pyramid with square base with side 42.6 m and slant height 61.4 m.

9. Find the surface area of the right circular cylinder with  $r = 2.3$  ft and  $h = 6.5$  ft.

10. Find the volume of the right circular cylinder with  $r = 165$  in and  $h = 214$  in.

11. Find the surface area and volume of the right circular cylinder.



12. Find the surface area of the right circular cone with  $r = 6.2$  cm and  $l = 9.5$  cm.

13. Find the volume of the right circular cone with  $r = 12.8$  m and  $h = 19.2$  m.

14. Find the lateral surface area and volume of the ice cream cone in the diagram.



15. A hollow metal tube is 2 m long. The outer diameter is 30 cm, and the inner diameter is 20 cm. How many cubic centimeters of metal were used to make the tube? [Recall that 1 m = 100 cm.]



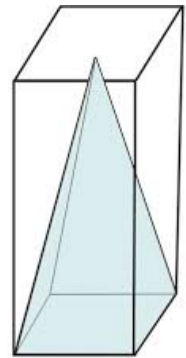
16. Find the surface area of the sphere with radius 3.9 ft.

17. Find the volume of the sphere with radius 1.23 cm.

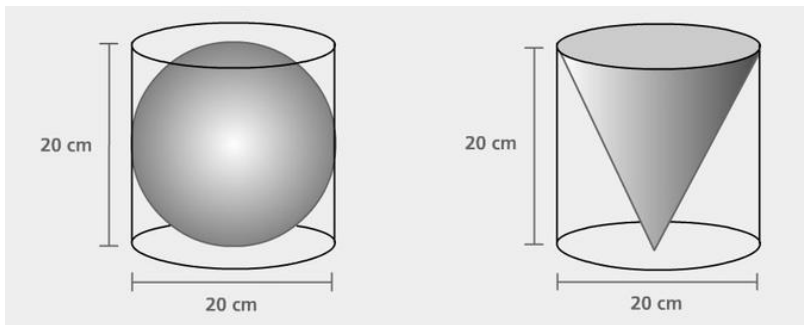
18. A spherical tank with radius 5.9 m is to be filled with a liquid weighing 0.9 grams per cubic centimeter. How many grams of the liquid will the tank hold?



19. Assume the prism and the pyramid share a square base with side measuring 4 in. Both figures also have a height of 10 in. Compare their volumes. Show your reasoning, and be specific in your comparison.

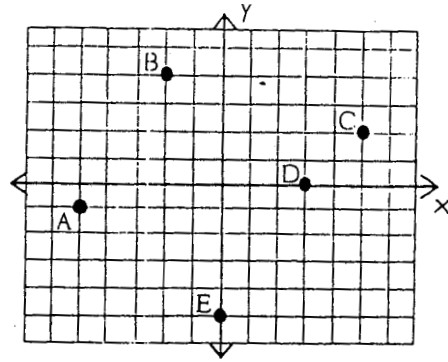


20. How do the volumes of the cone and sphere compare? Show your reasoning, and be specific in your comparison.



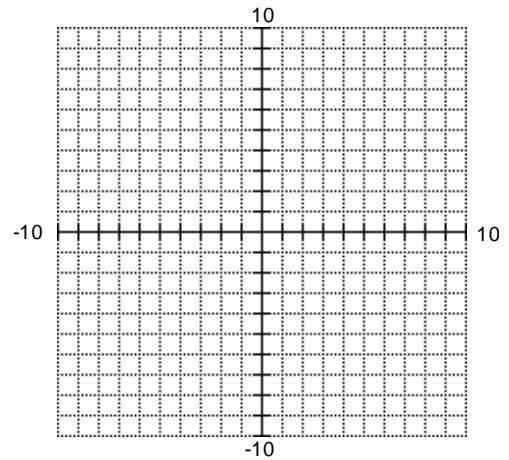
21. For each point, determine the corresponding ordered pair, and tell its quadrant (or axis).

- (a) A \_\_\_\_\_
- (b) C \_\_\_\_\_
- (c) E \_\_\_\_\_



22. Graph the line with slope  $-\frac{1}{4}$  that passes through the point given by  $(-4, 7)$ .

Then find its equation in slope-intercept form.



23. For the graph of  $y = 3x + 4$ , find the intercepts. Use ordered pairs.

x-intercept \_\_\_\_\_

y-intercept \_\_\_\_\_

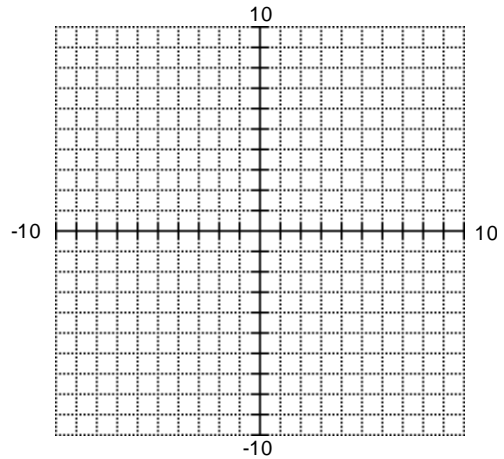
24. A linear equation of the form  $y = b$  ( $b$  is a constant) has as its graph a line parallel to which axis?

25. For the graph of  $2x + y - 4 = 0$ , find the intercepts. Use ordered pairs.

x-intercept \_\_\_\_\_

y-intercept \_\_\_\_\_

26. For the graph of  $x - 4 = 0$ , find any intercepts. Then graph this linear equation.



27. Find the slope of the line through the points.

(a)  $(0, 5)$  and  $(-2, 0)$       (b)  $(1, -2)$  and  $(3, 7)$       (c)  $(-5, 3)$  and  $(-6, -2)$

28. Find the distance between the points.

(a)  $(0, 5)$  and  $(-2, 0)$       (b)  $(1, -2)$  and  $(3, 7)$       (c)  $(-5, 3)$  and  $(-6, -2)$

29. The distance between the points  $(3, 2)$  and  $(x, 2)$  is 5. Find all possible values of  $x$ .

30. Find the midpoint of the segment joining  $(-4, 3)$  and  $(-6, -5)$ .

31. True or False.

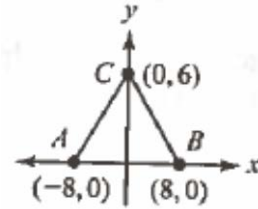
The line  $x = 5$  is vertical. \_\_\_\_\_

32. Fill in the blank so that the following pairs of lines are perpendicular.

$y = 5x - 2$        $y = \underline{\hspace{1cm}} x + 5$

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

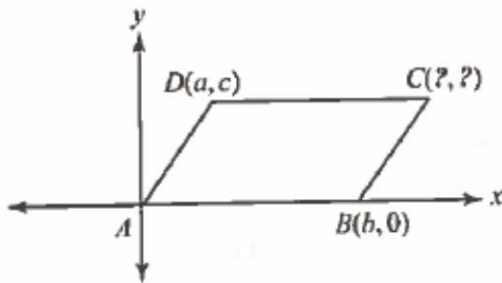
34. Given the isosceles triangle in the diagram, find its area and perimeter.



35. Find the general form of the equation of the line with slope  $-4$  and passing through  $(-1, 3)$ .

36. Find the slope-intercept form of the equation of the line perpendicular to the line containing  $(-2, -6)$  and  $(8, -4)$  which passes through the point midway between them.

37. If ABCD is a parallelogram, what are the coordinates of C?



38. Supply the missing coordinates in the square, then prove the diagonals of a square are congruent using analytic geometry.

