Name_____

Date_____Period_____

Determine the distance between each pair of points, and determine the coordinates of the midpoint of the segment connecting them.		
1. C(4, -8, 12) and D(7, 20, 18)	2. E(3, 7, -1) and F(5, 7, 2)	3. G(2, 2, 2) and H(-25, 4, 18)

Identify each of the following as true or false. If the statement is false, explain why.		
4. Every point on the yz-plane has coordinates (c, y, z) for any real number c.	5. The point at (1, 8, -12) is inside the sphere $(x-3)^2 + (y-5)^2 + (z+2)^2 = 9$.	6. The intersection of the xy-plane, the yz-plane, and the xz-plane is the point (0, 0, 0).
7. The set of points in space 5 units from the point at (1, -1, 3) can be described by the equation: $(x-1)^2 + (y+1)^2 + (z-3)^2 = 25$.	8. The set of points equidistant from A(2, 5, 8) and B(-3, 4, 7) is a line that is the perpendicular bisector of $\overline{AB}$.	

Determine the coordinates of the center and the measure of the radius for each sphere whose equation is given.	
9. $x^2 + (y-3)^2 + (z+8)^2 = 81$	10. $(x-5)^2 + (y+4)^2 + (z-10)^2 = 9$
11. $x^2 + y^2 + (z-3)^2 = 49$	12. $(x+4)^2 + (y-2)^2 + (z+12)^2 = 18$

Write the equation of the sphere using the given information.		
13. The center is at (-5, 11, -3), and the radius is 4.	14. The center is at (-2, 3, -4) and it contains the point at (5, -1, -1).	15. The diameter has endpoints at (14, -8, 32) and (-12, 10, 12).
16. It is concentric with the sphere with equation $(x+5)^2 + (y-4)^2 + (z-19)^2 = 9$, and it has a radius of 6 units.	17. It is inscribed in a cube determined by the points at (0, 0, 0), (4, 0, 0), (0, 4, 0), and (4, 4, 4).	

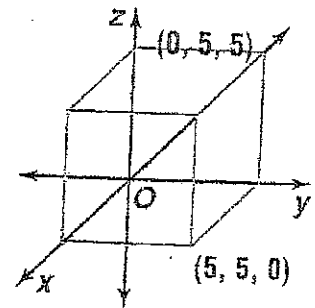18. Find the perimeter of a triangle with vertices A(-1, 3, 2), B(0, 2, 4), and C(-2, 0, 3).

19. Show that △ABC is an isosceles right triangle if the vertices are A(3, 2, -3), B(5, 8, 6), and C(-3, -5, 3).

20. Consider R(6, 1, 3), S(4, 5, 5), and T(2, 3, 1).
   (a) Determine the measures of $\overline{RS}, \overline{ST}$, and $\overline{RT}$.

   (b) If $\overline{RS}, \overline{ST}$, and $\overline{RT}$ are sides of a triangle, what type of triangle is △RST?

21. Find the surface area and volume of the rectangular prism at the right.

22. Find z if the distance between R(5, 4, -1) and S(3, -2, z) is 7.

Answers:

1. CD= $\sqrt{829}$, midpt=(5.5, 6, 15)
2. EF= $\sqrt{13}$, midpt=(4, 7, 0.5)
3. GH= $\sqrt{989}$, midpt=(-11.5, 3, 10)
4. false; c must be zero
5. false; the point is outside the sphere
6. true
7. true
8. false; it is a plane containing the ⊥ bisector of $\overline{AB}$

9. center(0, 3, -8); r=9
10. center(5, -4, 10); r=3
11. center(0, 0, 3); r=7
12. center(-4, 2, -12); r=$3\sqrt{2}$
13. $(x+5)^2 + (y-11)^2 + (z+3)^2 = 16$
14. $(x+2)^2 + (y-3)^2 + (z+4)^2 = 74$
15. $(x-1)^2 + (y-1)^2 + (z-22)^2 = 350$
16. $(x+5)^2 + (y-4)^2 + (z-19)^2 = 36$
17. $(x-2)^2 + (y-2)^2 + (z-2)^2 = 4$

18. perimeter= $\sqrt{6} + \sqrt{11} + 3$
19. AB = 11 and AC = 11 so △ is isosceles. $AB^2 + AC^2 = BC^2$ so △ is a right △.
20.(a)RS = $\sqrt{24}$, ST= $\sqrt{24}$,RT= $\sqrt{24}$
   (b) it is equilateral
21. SA = 150 u²; V = 125 u³
22. z = 2 or z = -4