

Pre-Test Unit 8: Geometry Applications KEY

You may use a calculator.

Answer the following questions. (Partial credit at teacher discretion)

1. What is the IF-THEN statement for the Pythagorean Theorem? (2 pts)

IF a triangle is a right triangle, then $a^2 + b^2 = c^2$ where a and b are leg lengths and c is hypotenuse length.

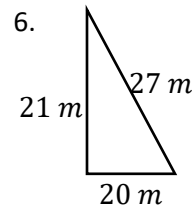
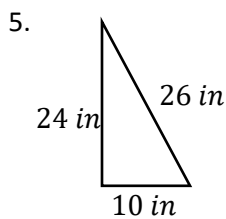
2. What is the Pythagorean Theorem used for? (3 pts)

3. What is the IF-THEN statement for the Pythagorean Theorem Converse? (2 pts)

IF $a^2 + b^2 = c^2$ in a triangle, then it is a right triangle.

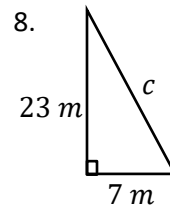
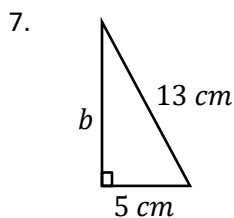
4. What is the Pythagorean Theorem Converse used for? (3 pts)

Determine if each of the following is a right triangle or not using the Pythagorean Theorem. (4 pts; 3 pts for set-up/work or explanation, 1 pts for correct answer)



Yes, it's a 5, 12, 13 multiplied by 2.

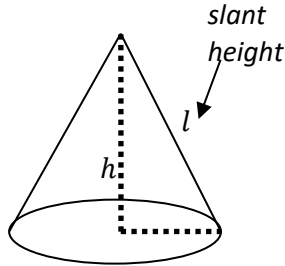
Find the length of the missing side of each right triangle. Round your answer to three decimal places if necessary. (4 pts; 2 pts for set-up/work or explanation, 2 pts for correct answer)



$b = 12 \text{ cm}$

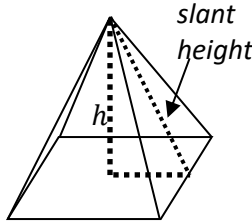
Find the value of the variable. Round your answer to three decimal places if necessary. (4 pts; 2 pts for set-up/work or explanation, 2 pts for correct answer)

9. The following cone has a radius of 6 mm and a height of 8 mm . What is l , the slant height?



$l = 10\text{ mm}$

10. The following pyramid has a square base that is 50 ft on each side. The slant height is 50 ft . What is h , the height of the pyramid?

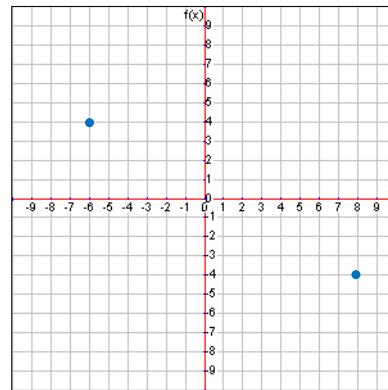


Determine the distance between the given points. Round your answer to three decimal places if necessary. (4 pts; 2 pts for set-up/work or explanation, 2 pts for correct answer)

11. $(-6, -3)$ and $(6, 2)$

13

12. $(-6, 4)$ and $(8, -4)$



Solve the following problems. (4 pts; 2 pts for set-up/work, 2 pts for correct final answer)

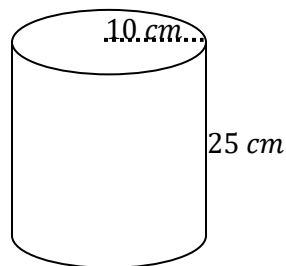
13. A hospital helicopter must go pick up a patient that is six miles west and eight miles north of the hospital. How many miles total will the helicopter travel to pick up the patient and bring him back to the hospital?

20 miles

14. A nature area has a rectangle field that is 10 miles by 5 miles and wants to put a fence along the diagonal of the field that will cost $\$1,000$ per mile. How much will the fence cost to the nearest dollar?

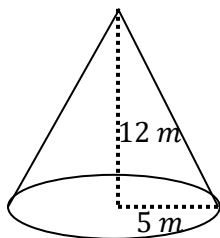
Find the given dimension of each shape either using $\pi \approx 3.14$ or giving your answer in terms of π . Round your answer to two decimal places if necessary. (5 pts; 3 pts for set-up/work, 2 pts for correct answer)

15. Find the volume

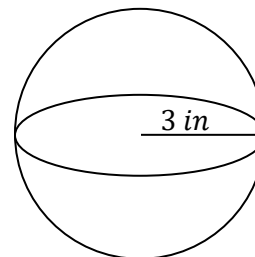


$$2500\pi \text{ cm}^3 \approx 7850 \text{ cm}^3$$

16. Find the volume



17. Find the volume



$$36\pi \text{ in}^3 \approx 113.04 \text{ in}^3$$

18. Find the radius of a cylindrical fire hose that is 200 ft long and has a volume of 39.25 ft^3 .

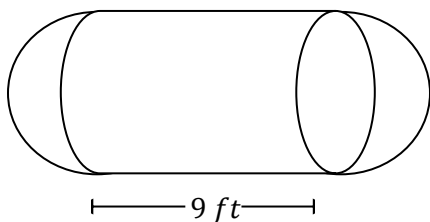
19. Find the height of a waffle cone for ice cream that has a volume of 25.12 in^3 and a radius of 2 in.

$$6 \text{ in}$$

20. Find the radius of a spherical water balloon with a volume of 904.32 cm^3 .

Find the volume of each shape either using $\pi \approx 3.14$ or giving your answer in terms of π . Round your answer to two decimal places if necessary. (10 pts; 4 pts for work/volume of each shape, 2 pts for final answer)

21. A cylindrical propane gas tank with half spheres on either end that is 9 ft long (not including the half spheres) and has a 3 ft radius



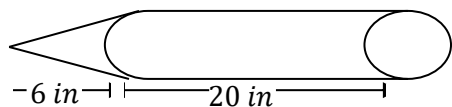
$$81\pi + 36\pi = 117\pi \text{ ft}^3 \approx 367.38 \text{ ft}^3$$

OR

$$\text{Cylinder} \approx 254.34 \text{ ft}^3$$

$$+\text{Sphere} \approx 113.04 \text{ ft}^3$$

22. A caulking gun with a radius of 1 in, cone height of 6 in, and cylinder height of 20 in



Lesson 8.1

Unit 8 Homework Key

1. What is the Pythagorean Theorem in your own words?

If a triangle is a right triangle, then $a^2 + b^2 = c^2$ where a and b are the side lengths of the legs and c is the length of the hypotenuse.

2. What does the Pythagorean Theorem allow us to do?

3. What is the Pythagorean Theorem Converse in your own words?

If $a^2 + b^2 = c^2$ in a triangle, then it is a right triangle.

4. What does the Pythagorean Theorem Converse allow us to do?

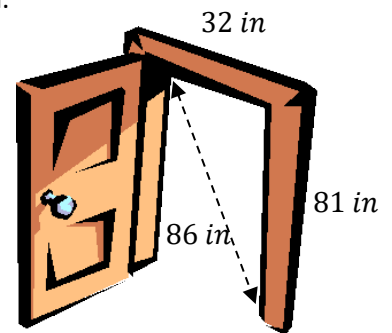
5. The door to your bathroom has never closed well. In fact, every time you try to use the bathroom, the cats bust open the door because it simply won't latch. You look at the door and it appears that the door frame is slightly tilted. The person who built your house claims that can't be true because he measured your door frame and found it to be an exact right angle. He claims what you're seeing is an optical illusion.

a. Without having a protractor, what could you do to see if he is correct without having a protractor?

Use the Pythag Converse to see if it works.

b. If you knew the door frame measurements were as pictured to the right, did the builder install your door frame correctly at a right angle?

No because $32^2 + 81^2 \neq 86^2$.



6. Bob is building a triangular garden and needs fencing around it to keep the rabbits out. He has one section of fence measuring 40 ft, another measuring 42 ft, and a third measuring 58 ft. Bob says that after the fence is complete it will make a right triangle using the following argument: "First, I'll set-up the longest section of fence. Next, I'll attach the other two sections to either end of the long one. Finally, I'll swing the two shorter sections together. Since they must meet together, that makes it a right triangle."

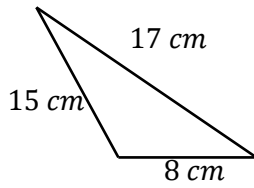
a. Is Bob correct that the garden fence will make a right triangle?

b. If so, is Bob's argument correct for why it will make a right triangle?

c. What would be a better argument?

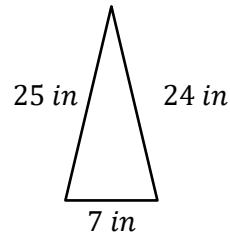
Determine if the following triangles are right triangles or not using the Pythagorean Theorem.

7.

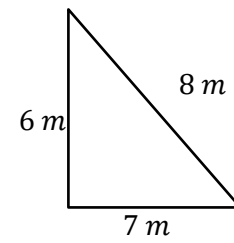


Yes, right triangle

8.

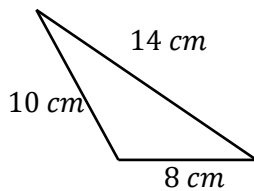


9.

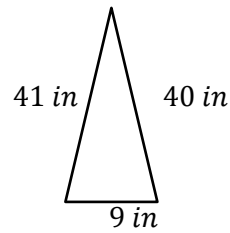


No, not right triangle

10.

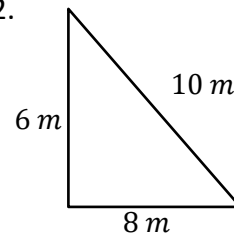


11.



Yes, right triangle

12.



13. $a = 12 \text{ ft}$

$b = 16 \text{ ft}$

$c = 25 \text{ ft}$

No, not right triangle

14. $a = 12 \text{ km}$

$b = 35 \text{ km}$

$c = 37 \text{ km}$

15. $a = 10 \text{ mm}$

$b = 24 \text{ mm}$

$c = 27 \text{ mm}$

No, not right triangle

16. $a = 20 \text{ ft}$

$b = 21 \text{ ft}$

$c = 29 \text{ ft}$

17. $a = 5 \text{ km}$

$b = 12 \text{ km}$

$c = 17 \text{ km}$

No, not right triangle

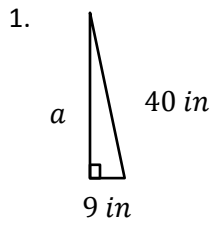
18. $a = 5 \text{ mm}$

$b = 12 \text{ mm}$

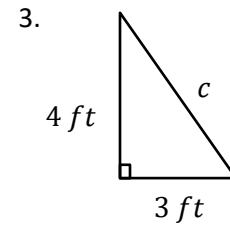
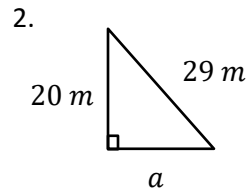
$c = 13 \text{ mm}$

Lesson 8.2

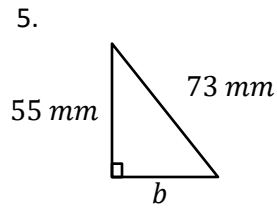
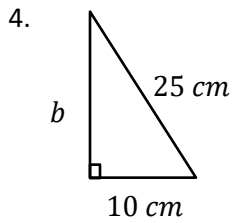
Find the length of the missing side of each right triangle. Round your answers to three decimal places if necessary.



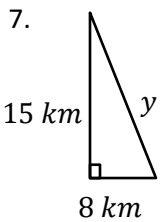
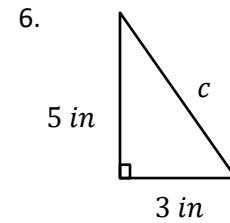
$$a \approx 38.974 \text{ in}$$



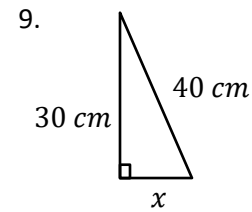
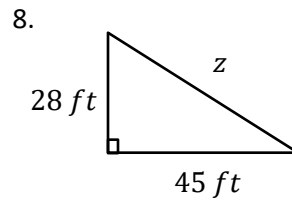
$$c = 5 \text{ ft}$$



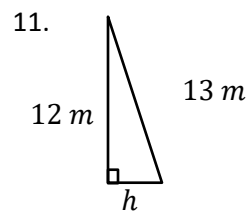
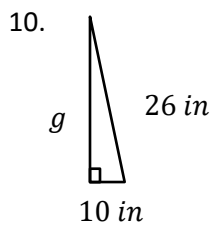
$$b = 48 \text{ mm}$$



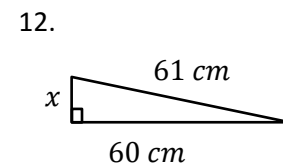
$$y = 17 \text{ km}$$

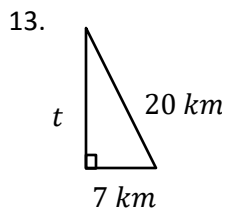


$$x \approx 26.458 \text{ cm}$$

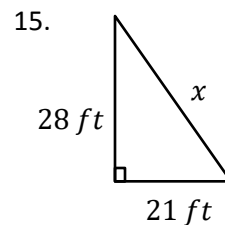
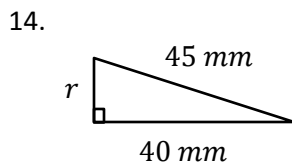


$$h = 5 \text{ m}$$





$t \approx 18.735 \text{ km}$



$x = 35 \text{ ft}$

Solve the following problems. Round your answers to the nearest whole number when necessary.

16. You're locked out of your house, and the only open window is on the second floor 25 feet above the ground. There are bushes along the side of the house that force you to put the base of the ladder 7 feet away from the base of the house. How long of a ladder will you need to reach the window?

17. Shae takes off from her house and runs 3 miles north and 4 miles west. Tired, she wants to take the shortest route back. How much farther will she have to run if she heads straight back to her house?

5 miles

18. Televisions are advertised by the length of their diagonals. If a 42 inch television measures 18 inches high, how wide is the television?

19. A soccer field is 100 yards by 60 yards. How long is the diagonal of the field?

$\approx 117 \text{ yards}$

20. Leonard walks 14 meters south and 48 meters east to get to school. If he takes the straight path home after school, how far will he have to walk?

21. You place a 24 foot ladder 10 feet away from the house. The top of the ladder just reaches a window on the second floor. How high off the ground is the window?

$\approx 22 \text{ feet}$

22. The dimensions of a basketball court are 74 feet and 42 feet. What is the length of the diagonal of the court?

23. Televisions are advertised by the length of their diagonals. If a TV measures 22 inches high and 45 inches wide, by what size will the TV be advertised.

≈ 50 in

24. A rectangular garden measures 5 feet wide by 12 feet long. If a hose costs \$5 per foot, how much would it cost to place a hose through the diagonal of the garden?

25. A football field is 160 feet wide and 360 feet long. The coach wants to put spray paint along the diagonal of the field. If the spray paint costs approximately \$1 per foot of coverage, how much should the coach budget for spray paint?

$\approx \$394$

26. A rectangular park measures 8 miles long by 6 miles wide. The park director wants to put a fence along both sides of the trail that runs diagonally through the park. If the fence costs \$150 per mile, how much will it cost to buy the fence?

27. A rectangular pool has a diagonal of 17 yards and a length of 15 yards. If the paint costs \$2 per yard of coverage, how much will it cost the owner to paint the width of both ends of the pool?

\$32

28. A rectangular dog pen is 3 meters by 4 meters. If a chain costs \$1.75 per meter, how much would it cost to put a chain along the diagonal of the pen?

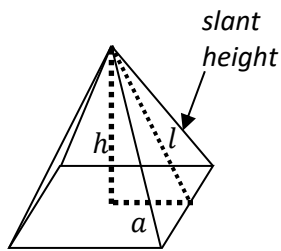
29. Architects built a doorway that was 4 feet wide by 7 feet tall. The diagonal measured 7.3 feet. Are the angles in the doorway right angles?

No

30. A rectangular garden measures 3 meters wide by 4 meters long. The diagonal of the garden measures 5 meters. Are the angles in the garden right angles?

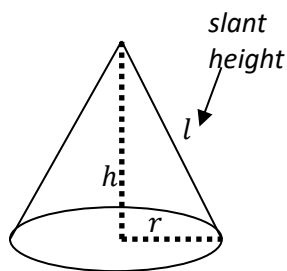
Lesson 8.3

Use the picture below to find information about the pyramid with a square base in problems 1-14. Round your answers to three decimal places if necessary.



- The pyramid has a square base that is 70 ft on each side. The slant height is 37 ft . What is h , the height of the pyramid?
 12 ft
- The pyramid has a square base that is 120 in on each side. The slant height is 61 in . What is h , the height of the pyramid?
- The pyramid has a square base that is 50 m on each side. The slant height is 30 m . What is h , the height of the pyramid?
 $\approx 16.583\text{ m}$
- The pyramid has a square base that is 14 cm on each side. The slant height is 25 cm . What is h , the height?
- The pyramid has a square base that is 14 cm on each side. The height is 24 cm . What is l , the slant height?
 25 cm
- The pyramid has a square base that is 24 ft on each side. The height is 5 ft . What is l , the slant height?
- The pyramid has a square base that is 70 mm on each side. The height is 10 mm . What is l , the slant height?
 $\approx 36.401\text{ mm}$
- The pyramid has a square base that is 26 ft on each side. The height is 82 ft . What is l , the slant height?
- The height of the pyramid is 15 cm , and the slant height is 39 cm . Find the value of a in the diagram.
 36 cm
- The height of the pyramid is 80 in , and the slant height is 82 in . Find the value of a in the diagram.
- The slant height is 17 ft and the height is 8 ft . What is s , the side length of the base?
 30 ft
- The slant height is 10 cm and the height is 8 cm . What is s , the side length of the base?
- The slant height is 26 mm and the height is 10 mm . What is s , the side length of the base?
 48 mm
- The slant height is 50 ft and the height is 32 ft . What is s , the side length of the base?

Use the picture below to find information about the pyramid in problems 15-26. Round your answers to three decimal places if necessary.



15. The cone has a radius of 12 *cm* and a height of 5 *cm*. What is l , the slant height of the cone?

13 *cm*

16. The cone has a radius of 15 *mm* and a height of 8 *mm*. What is l , the slant height of the cone?

17. The cone has a radius of 24 *in* and a height of 70 *in*. What is l , the slant height of the cone?

74 *in*

18. The cone has a radius of 40 *cm* and a height of 42 *cm*. What is l , the slant height of the cone?

19. The cone has a radius of 30 *ft* and a slant height of 34 *ft*. What is h , the height of the cone?

16 *ft*

20. The cone has a radius of 33 *m* and a slant height of 65 *m*. What is h , the height of the cone?

21. The cone has a radius of 16 *in* and a slant height of 20 *in*. What is h , the height of the cone?

12 *in*

22. The cone has a radius of 30 *cm* and a slant height of 50 *cm*. What is h , the height of the cone?

23. The cone has a height of 16 *cm* and a slant height of 65 *cm*. What is r , the radius of the cone?

63 *cm*

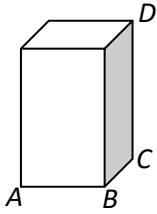
24. The cone has a height of 48 *ft* and a slant height of 50 *ft*. What is r , the radius of the cone?

25. The cone has a height of 4 *in* and a slant height of 6 *in*. What is r , the radius of the cone?

≈ 4.472 *in*

26. The cone has a height of 14 *cm* and a slant height of 55 *cm*. What is r , the radius of the cone?

Use the picture below to find lengths of segments in the rectangular prism in problems 27-38. Round your answers to three decimal places if necessary.



27. The length of \overline{AB} is 6 *ft* and the length of \overline{BC} is 8 *ft*. Find the length of \overline{AC} .
10 *ft*

28. The length of \overline{AB} is 40 *mm* and the length of \overline{BC} is 42 *mm*. Find the length of \overline{AC} .

29. The length of \overline{AB} is 23 *cm* and the length of \overline{BC} is 70 *cm*. Find the length of \overline{AC} .
 ≈ 73.682 *cm*

30. The length of \overline{AB} is 7 *in* and the length of \overline{BC} is 7 *in*. Find the length of \overline{AC} .

31. The length of \overline{AC} is 13 *mm* and the length of \overline{DC} is 84 *mm*. Find the length of \overline{AD} .
85 *mm*

32. The length of \overline{AC} is 5 *ft* and the length of \overline{DC} is 12 *ft*. Find the length of \overline{AD} .

33. The length of \overline{AC} is 11 *mm* and the length of \overline{DC} is 30 *mm*. Find the length of \overline{AD} .
 ≈ 31.953 *mm*

34. The length of \overline{AC} is 5 *in* and the length of \overline{DC} is 4 *in*. Find the length of \overline{AD} .

35. The length of \overline{AB} is 4 *ft*, the length of \overline{BC} is 3 *ft* and the length of \overline{DC} is 12 *ft*. Find the length of \overline{AD} .
13 *ft*

36. The length of \overline{AB} is 12 *cm*, the length of \overline{BC} is 5 *cm* and the length of \overline{DC} is 84 *cm*. Find the length of \overline{AD} .

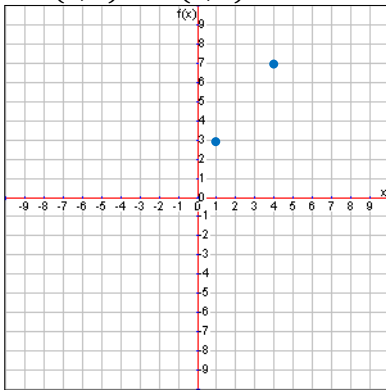
37. The length of \overline{AB} is 2 *ft*, the length of \overline{BC} is 3 *ft* and the length of \overline{DC} is 10 *ft*. Find the length of \overline{AD} .
 ≈ 10.630 *ft*

38. The length of \overline{AB} is 6 *mm* the length of \overline{BC} is 8 *mm* and the length of \overline{DC} is 50 *mm*. Find the length of \overline{AD} .

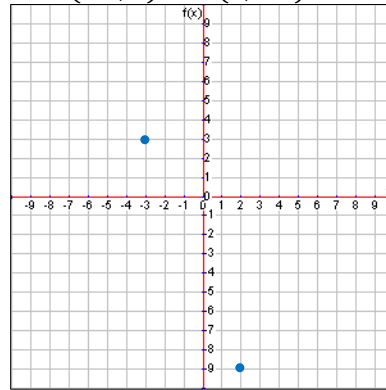
Lesson 8.4

Determine the distance between the given points. Round your answers to three decimal places if necessary.

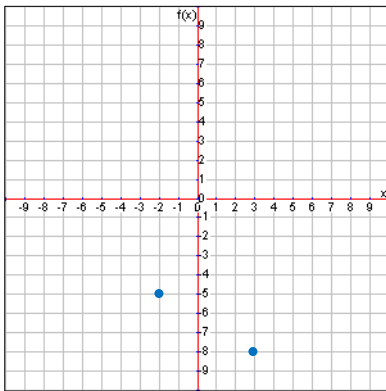
1. $(1, 3)$ and $(4, 7)$ **5 units**



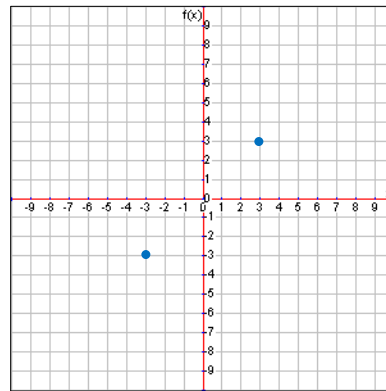
2. $(-3, 3)$ and $(2, -9)$



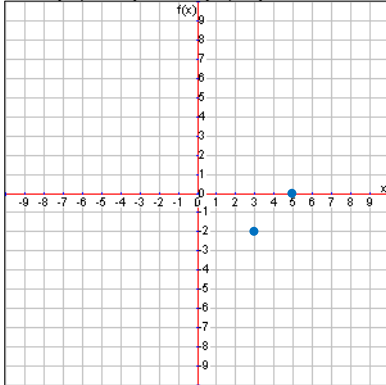
3. $(-2, -5)$ and $(3, -8)$ **≈ 5.831 units**



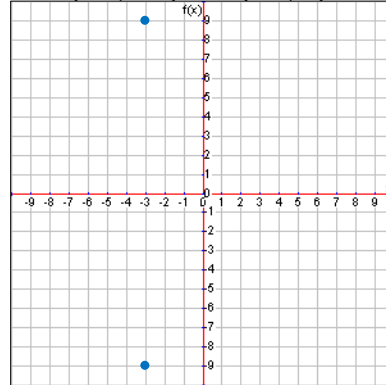
4. $(-3, -3)$ and $(3, 3)$



5. $(3, -2)$ and $(5, 0)$ **≈ 2.828 units**



6. $(-3, -9)$ and $(-3, 9)$



7. $(2, 1)$ and $(3, -3)$ ≈ 4.123 units

8. $(4, -2)$ and $(7, 2)$

9. $(1, 1)$ and $(7, 9)$ 10 units

10. $(-8, 2)$ and $(6, 2)$

11. $(-4, 6)$ and $(6, 2)$ ≈ 10.770 units

12. $(2, 4)$ and $(5, -2)$

13. $(-5, -3)$ and $(6, 6)$ ≈ 14.213 units

14. $(-5, 4)$ and $(7, 3)$

15. $(-9, -3)$ and $(-4, 4)$ ≈ 8.602 units

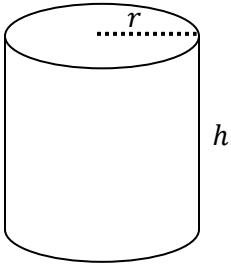
16. $(2, -4)$ and $(5, 4)$

17. $(0, 7)$ and $(4, 2)$ ≈ 6.403 units

18. $(-8, 7)$ and $(7, -5)$

Lesson 8.5

Answer the following questions either using $\pi \approx 3.14$ or giving your answer in terms of π . Round your answer to the nearest hundredth where necessary.



1. Find the volume of a cylinder with a radius of 3 *in* and a height of 10 *in*.
 $90\pi \text{ in}^3 \approx 282.6 \text{ in}^3$
2. Find the volume of a cylinder with a radius of 10 *mm* and a height of 2 *mm*.
3. Find the volume of a cylinder with a radius of 5 *cm* and a height of 15 *cm*.
 $375\pi \text{ cm}^3 \approx 1177.5 \text{ cm}^3$
4. Find the volume of a cylinder with a diameter of 22 *m* and a height of 5 *m*.
5. Find the volume of a cylinder with a diameter of 4 *ft* and a height of 1 *ft*.
 $4\pi \text{ ft}^3 \approx 12.56 \text{ ft}^3$
6. Find the volume of a cylinder with a radius of 9 *in* and a height of 9 *in*.

7. Find the volume of a can of green beans with a radius of 3 *cm* and a height of 8 *cm*.
 $72\pi \text{ cm}^3 \approx 226.08 \text{ cm}^3$
8. Find the volume of a cylindrical can of oatmeal with a radius of 8 *cm* and a height of 45 *cm*.
9. Find the volume of a cylindrical water bottle with a diameter of 4 *cm* and a height of 30 *cm*.
 $120\pi \text{ cm}^3 \approx 376.8 \text{ cm}^3$
10. Find the volume of a can of Pepsi with a diameter of 2 *in* and a height of 3.5 *in*.
11. Find the volume of a water pipe with a radius of 0.75 *ft* and a length of 16 *ft*.
 $9\pi \text{ ft}^3 \approx 28.26 \text{ ft}^3$
12. Find the volume of a straw used for drinking with a radius of 2 *mm* and a height of 170 *mm*.

13. Find the volume of a cone with a radius of 3 *in* and a height of 10 *in*.

$$30\pi \text{ in}^3 \approx 94.2 \text{ in}^3$$

14. Find the volume of a cone with a radius of 10 *mm* and a height of 3 *mm*.

15. Find the volume of a cone with a radius of 5 *cm* and a height of 15 *cm*.

$$125\pi \text{ cm}^3 \approx 392.5 \text{ cm}^3$$

16. Find the volume of a cone with a radius of 12 *m* and a height of 5 *m*.

17. Find the volume of a cone with a diameter of 4 *ft* and a height of 9 *ft*.

$$12\pi \text{ ft}^3 \approx 37.68 \text{ ft}^3$$

18. Find the volume of a cone with a diameter of 18 *in* and a height of 9 *in*.

19. Find the volume of a waffle cone for ice cream with a radius of 4 *cm* and a height of 12 *cm*.

$$64\pi \text{ cm}^3 \approx 200.96 \text{ cm}^3$$

20. Find the volume of a cone birthday hat with a radius of 2 *in* and a height of 9 *in*.

21. Find the volume of a funnel with a diameter of 10 *cm* and a height of 9 *cm*.

$$75\pi \text{ cm}^3 \approx 235.5 \text{ cm}^3$$

22. Find the volume of a sphere with a diameter of 6 *in*.

23. Find the volume of a sphere with a diameter of 18 *mm*.

$$972\pi \text{ mm}^3 \approx 3052.08 \text{ mm}^3$$

24. Find the volume of a sphere with a radius of 6 *cm*.

25. Find the volume of a sphere with a radius of 12 *m*.

$$2304\pi \text{ m}^3 \approx 7234.56 \text{ m}^3$$

26. Find the volume of a sphere with a radius of 2 *ft*.

27. Find the volume of a sphere with a radius of 5 *in*.

$$166.67\pi \text{ in}^3 \approx 523.33 \text{ in}^3$$

28. Find the volume of a mini basketball with a radius of 3.5 *in*.

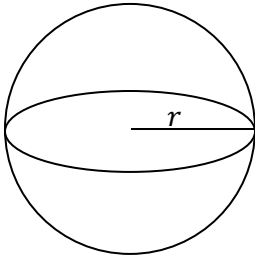
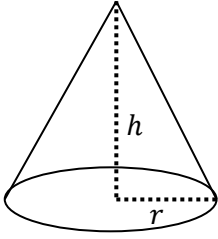
29. Find the volume of the Earth with a diameter of approximately 12,756 *km*.

$$3.46 \times 10^{11}\pi \text{ km}^3 \approx 1.09 \times 10^{12} \text{ km}^3$$

30. Find the volume of the moon with a diameter of approximately 3475 *km*.

31. Find the volume of a gumball with a radius of 3 *mm*.

$$36\pi \text{ mm}^3 \approx 113.04 \text{ mm}^3$$



Lesson 8.6

Answer the following questions using $\pi \approx 3.14$. Round your answer to the nearest hundredth where necessary.

- Find the height of a cylinder with a volume of 30 in^3 and a radius of 1 in .
 $h \approx 9.55 \text{ in}$
- Find the height of a cylinder with a volume of 100 cm^3 and a radius of 2 cm .
- Find the height of a cylinder with a volume of $720\pi \text{ ft}^3$ and a radius of 6 ft .
 $h = 20 \text{ ft}$
- Find the height of a cylinder with a volume of $1215\pi \text{ mm}^3$ and a radius of 9 mm .
- Find the radius of a cylinder with a volume of 950 in^3 and a height of 10 in .
 $r \approx 5.5 \text{ in}$
- Find the radius of a cylinder with a volume of 208 cm^3 and a height of 4 cm .
- Find the radius of a cylinder with a volume of $108\pi \text{ ft}^3$ and a height of 12 ft .
 $r = 3 \text{ ft}$
- Find the radius of a cylinder with a volume 686 mm^3 and a height of 14 mm .
- Find the height of a cone with a volume of 150 in^3 and a radius of 10 in .
 $h \approx 1.43 \text{ in}$
- Find the height of a cone with a volume of 21 ft^3 and a radius of 4 ft .
- Find the radius of a cone with a volume of 175 cm^3 and a height of 21 cm .
 $r \approx 2.82 \text{ cm}$
- Find the radius of a cone with a volume of $196\pi \text{ mm}^3$ and a height of 12 mm .
- Find the radius of a sphere with volume $\approx 113.04 \text{ in}^3$.
 $r = 3 \text{ in}$
- Find the radius of a sphere with volume $\approx 904.32 \text{ cm}^3$.
- Find the radius of a sphere with volume $\approx 3052.08 \text{ m}^3$.
 $r = 9 \text{ m}$
- Find the radius of a sphere with volume $\approx 4.18\bar{6} \text{ ft}^3$.

Lesson 8.7

Answer the following questions using $\pi \approx 3.14$ and rounding your answer to the nearest hundredth where necessary.



- Find the volume of a cone used for the tip of a rocket with a diameter of 12 yds and a height of 15 yds.

$$180\pi \text{ yards}^3 \approx 565.2 \text{ yards}^3$$

- Find the volume of a pencil with a radius of 0.5 cm, a cone height of 3 cm, and a cylinder height of 14 cm.

- Find the volume of a model rocket with a radius of 1 in, a cone height of 3 in, and a cylinder height of 8 in.

$$9\pi \text{ in}^3 \approx 28.26 \text{ in}^3$$

- Find the volume of a caulking gun with a radius of 2 cm, a cone height of 3 cm, and a cylinder height of 20 cm.

- Find the volume of a crayon with a radius of 2 mm, a cone height of 21 mm, and a cylinder height of 80 mm.

$$348\pi \text{ mm}^3 \approx 1092.72 \text{ mm}^3$$

- Find the volume of a model jet with a radius of 1 ft, a cone height of 3 ft, and a cylinder height of 6 ft.

- Find the radius of a pencil with a volume of $110\pi \text{ mm}^3$, a cone height of 3 mm, and a cylinder height of 10 mm.

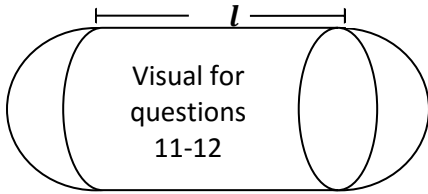
$$r \approx 3.16 \text{ mm}$$

- Find the radius of a model rocket with a volume of 2500 in^3 , a cone height of 6 in, and a cylinder height of 25 in.

- Find the cylinder height of a caulking gun with a volume of 300 in^3 , a cone height of 6 in, and a radius of 2 in.

$$h \approx 21.89 \text{ in}$$

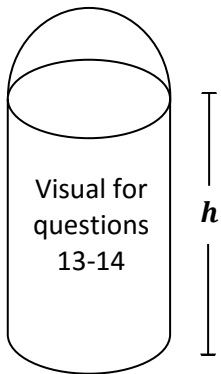
- Find the cone height of a pencil with a volume of 750 mm^3 , a radius of 3 mm, and a cylinder height of 25 mm.



11. Find the volume of a propane gas tank with half spheres on either end that has a radius of 3 ft and a length (l) of 7 ft .

$$99\pi\text{ ft}^3 \approx 310.86\text{ ft}^3$$

12. Find the volume of a submarine with half spheres on either end that has a radius of 6 m and a length (l) of 15 m .



13. Find the volume of a grain silo with a half sphere on one end that has a diameter of 6 m and a height (h) of 15 m .

$$153\pi\text{ m}^3 \approx 480.42\text{ m}^3$$

14. Find the volume of a grain silo with a half sphere on one end that has a diameter of 6 ft and a height (h) of 35 ft .

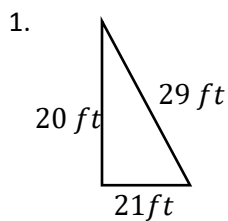
Review Unit 8: Geometry Applications KEY

You may use a calculator.

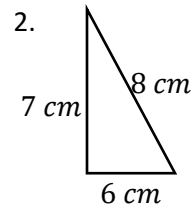
Unit 8 Goals

- Explain a proof of the Pythagorean Theorem and its converse. (8.G.6)
- Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions. (8.G.7)
- Apply the Pythagorean Theorem to find the distance between two points in a coordinate system. (8.G.8)
- Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems. (8.G.9)

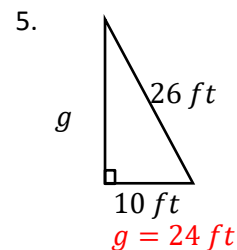
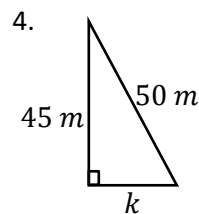
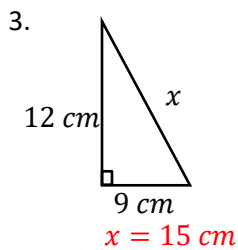
Determine if the following triangles are right triangles or not using the Pythagorean Theorem.



Yes, $21^2 + 20^2 = 29^2$



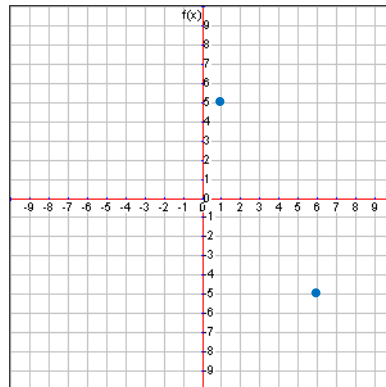
Find the length of the missing side of each right triangle. Round to three decimal places if necessary.



Determine the distance between the given points. Round to three decimal places if necessary.

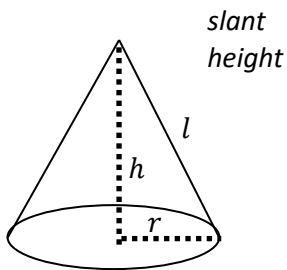
6. $(0, -8)$ and $(6, 0)$

7. $(1, 5)$ and $(6, -5) \approx 11.180 \text{ units}$

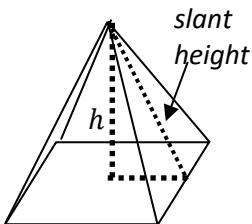


Find the value of the variable.

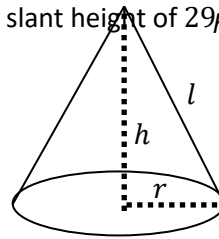
8. The following cone has a radius of 11 mm and a slant height of 61 mm . What is h , the height?



10. The following pyramid has a square base that is 30 ft on each side. The height is 8 ft . What is l , the slant height of the pyramid?

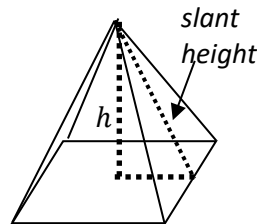


9. The following cone has a height of 20 cm and a slant height of 29 cm . What is r , the radius?



$r = 21\text{ cm}$

11. The following pyramid has a square base. The height is 12 in and the slant height is 20 in . What is s , the side length of the base of the pyramid?



$s = 32\text{ in}$

Solve the following problems.

12. Firefighters position an 85-foot ladder 13 feet away from the building. The top of the ladder just reaches a window on the fourth floor. How high off the ground is the window?

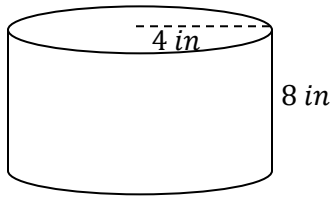
13. The school is located 9 meters north and 40 meters west of Kiley's house. Kiley walks through her neighbors' yards, so she can take the shortest route possible (a straight line). How far does she have to travel if she walks to and from school?

82 meters

14. An open field is 85 meters wide and 105 meters long. The owner wants to put spray paint along both diagonals of the field. If the spray paint costs approximately $\$2$ per meter of coverage, how much should the owner budget for spray paint?

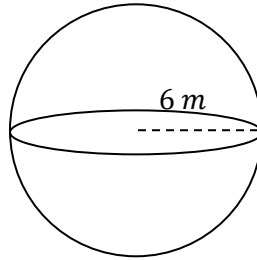
Find the volume of the given shapes using $\pi \approx 3.14$ for your answers or in terms of π .

15.

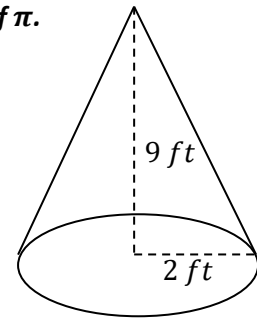


$$V = 128\pi \approx 401.92 \text{ in}^3$$

16.



17.



$$V = 12\pi \approx 37.68 \text{ ft}^3$$

18. Cylinder

$$h = 12 \text{ in}$$

$$r = 2 \text{ in}$$

19. Cone

$$h = 15 \text{ cm}$$

$$r = 3 \text{ cm}$$

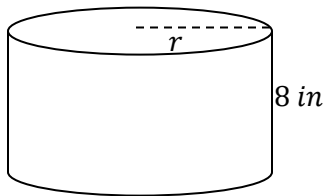
20. Sphere

$$r = 3 \text{ m}$$

$$V = 45\pi \approx 141.3 \text{ cm}^3$$

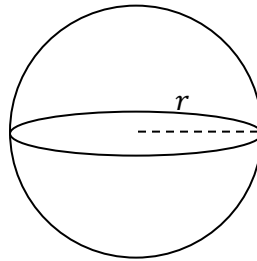
Find the missing dimension of the given shapes using $\pi \approx 3.14$ for your answers or in terms of π .

21. $V \approx 401.92 \text{ in}^3$



$$r = 4 \text{ in}$$

22. $V \approx 3052.08 \text{ m}^3$



25. Cone

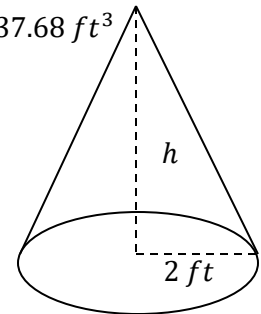
$$h = ?$$

$$r = 3 \text{ cm}$$

$$V \approx 141.3 \text{ cm}^3$$

$$h = 15 \text{ cm}$$

23. $V \approx 37.68 \text{ ft}^3$



$$h = 9 \text{ ft}$$

24. Cylinder

$$h = 12 \text{ in}$$

$$r = ?$$

$$V \approx 150.72 \text{ in}^3$$

26. Sphere

$$r = ?$$

$$V \approx 113.04 \text{ mm}^3$$

Find the volume of the given shapes in terms of π or using $\pi \approx 3.14$.

27. A spherical volleyball with a radius of 15 *cm*.

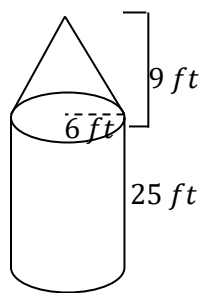
$$V = 4500\pi \text{ cm}^3 \approx 14130 \text{ cm}^3$$

28. A cylindrical water bottle with a height of 10 *in* and a radius of 1 *in*.

29. An ice cream cone with a height of 6 *in* and radius of 2 *in*.

$$V = 8\pi \text{ in}^3 \approx 25.12 \text{ in}^3$$

30. A grain silo as pictured:



31. A propane tank as pictured:

$$V = 90\pi + 36\pi \\ = 126\pi \approx 395.64 \text{ m}^3$$

