## Lesson 8.1

## Unit 8 Homework Key

Determine if the following triangles are right triangles or not using the Pythagorean Theorem.
1.


Yes, right triangle
4.


No, not right triangle
2.


Yes, right triangle
5.


Yes, right triangle
3.


No, not right triangle
6.


Yes, right triangle

$$
\text { 7. } \begin{aligned}
a & =12 \mathrm{ft} \\
b & =16 \mathrm{ft} \\
c & =25 \mathrm{ft}
\end{aligned}
$$

No, not right triangle
10. $a=20 f t$
$b=21 \mathrm{ft}$
$c=29 \mathrm{ft}$
Yes, right triangle
8. $a=12 \mathrm{~km}$
$b=35 \mathrm{~km}$
$c=37 \mathrm{~km}$
Yes, right triangle
11. $a=5 \mathrm{~km}$
$b=12 \mathrm{~km}$
$c=17 \mathrm{~km}$
No, not right triangle
9. $a=10 \mathrm{~mm}$
$b=24 \mathrm{~mm}$
$c=27 \mathrm{~mm}$
No, not right triangle
12. $a=5 \mathrm{~mm}$
$b=12 \mathrm{~mm}$
$c=13 \mathrm{~mm}$
Yes, right triangle

## Lesson 8.2

Find the length of the missing side of each right triangle. Round your answers to three decimal places if necessary.
1.
$\curvearrowright$

2.

3.


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

$a=21 \mathrm{~m}$

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

4. 


10 cm
$b \approx 22.913 \mathrm{~cm}$
5.
$b=48 \mathrm{~mm}$
6.

$c \approx 5.831$ in

$y=17 \mathrm{~km}$
8.

$z=53 \mathrm{ft}$
10.

$g=24$ in
$12 \mathrm{~m} \bigcap_{h}^{11 .} 13 \mathrm{~m}$
$h=5 m$
$x \approx 26.458 \mathrm{~cm}$

12.

$x=11 \mathrm{~cm}$
13.

7 km
14.

$r \approx 20.616 \mathrm{~mm}$
$t \approx 18.735 \mathrm{~km}$
15.
$28 f t \underbrace{x}_{21 f t}$
$x=35 \mathrm{ft}$

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?

$$
\approx 26 \mathrm{feet}
$$

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?

$$
\approx 38 \text { inches }
$$

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?

$$
50 \text { meters }
$$

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?

$$
\approx 85 \text { feet }
$$

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.

$$
\approx 50 \mathrm{in}
$$

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?

## \$65

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?

## \$3000

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?
\$8.75
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?

## Yes

## 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.



1. 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?

$$
12 \mathrm{ft}
$$

2. 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?

11 in
3. 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?

$$
\approx 16.583 \mathrm{~m}
$$

4. The pyramid has a square base that is 14 cm on each side. The slant height is 25 cm . What is $h$, the height?

$$
24 \mathrm{~cm}
$$

5. 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
6. The pyramid has a square base that is 24 ft on each side. The height is 5 ft . What is $l$, the slant height?

$$
13 \mathrm{ft}
$$

7. The pyramid has a square base that is 70 mm on each side. The height is 10 mm . What is $l$, the slant height?

$$
\approx 36.401 \mathrm{~mm}
$$

8. The pyramid has a square base that is 26 ft on each side. The height is 82 ft . What is $l$, the slant height?

$$
\approx 83.024 \mathrm{ft}
$$

9. The height of the pyramid is 15 cm , and the slant height is 39 cm . Find the value of $a$ in the diagram.

$$
36 \mathrm{~cm}
$$

10. The height of the pyramid is 80 in , and the slant height is 82 in . Find the value of $a$ in the diagram. 18 in
11. The slant height is 17 ft and the height is 8 ft . What is $s$, the side length of the base?

30 ft
12. The slant height is 10 cm and the height is 8 cm . What is $s$, the side length of the base?

12 cm
13. The slant height is 26 mm and the height is 10 mm . What is $s$, the side length of the base?

$$
48 \mathrm{~mm}
$$

14. The slant height is 50 ft and the height is 32 ft . What is $s$, the side length of the base?

$$
\approx 76.837 \mathrm{ft}
$$

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?

$$
13 \mathrm{~cm}
$$

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

$$
17 \mathrm{~mm}
$$

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? 58 cm
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? 56 m
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? 40 cm
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?

$$
14 f t
$$

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

$$
\approx 4.472 \mathrm{in}
$$

26. The cone has a height of 14 cm and a slant height of 55 cm . What is $r$, the radius of the cone? $\approx 53.188 \mathrm{~cm}$

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 $\overline{A B}$ is 6 ft and the length of $\overline{B C}$ is 8 ft . Find the length of $\overline{A C}$. 10 ft
28. The length of $\overline{A B}$ is 40 mm and the length of $\overline{B C}$ is 42 mm . Find the length of $\overline{A C}$. 58 mm
29. The length of $\overline{A B}$ is 23 cm and the length of $\overline{B C}$ is 70 cm . Find the length of $\overline{A C}$.

$$
\approx 73.682 \mathrm{~cm}
$$

30. The length of $\overline{A B}$ is 7 in and the length of $\overline{B C}$ is 7 in . Find the length of $\overline{A C}$.

$$
\approx 9.899 \mathrm{in}
$$

31. The length of $\overline{A C}$ is 13 mm and the length of $\overline{D C}$ is 84 mm . Find the length of $\overline{A D}$.

$$
85 \mathrm{~mm}
$$

32. The length of $\overline{A C}$ is 5 ft and the length of $\overline{D C}$ is 12 ft . Find the length of $\overline{A D}$.

$$
13 \mathrm{ft}
$$

33. The length of $\overline{A C}$ is 11 mm and the length of $\overline{D C}$ is 30 mm . Find the length of $\overline{A D}$.

$$
\approx 31.953 \mathrm{~mm}
$$

34. The length of $\overline{A C}$ is 5 in and the length of $\overline{D C}$ is 4 in . Find the length of $\overline{A D}$.

$$
\approx 6.403 \mathrm{in}
$$

35. The length of $\overline{A B}$ is $4 f t$, the length of $\overline{B C}$ is $3 f t$ and the length of $\overline{D C}$ is 12 ft . Find the length of $\overline{A D}$. $13 f t$
36. The length of $\overline{A B}$ is 12 cm , the length of $\overline{B C}$ is 5 cm and the length of $\overline{D C}$ is 84 cm . Find the length of $\overline{A D}$. 85 cm
37. The length of $\overline{A B}$ is $2 f t$, the length of $\overline{B C}$ is 3 ft and the length of $\overline{D C}$ is 10 ft . Find the length of $\overline{A D}$.

$$
\approx 10.630 \mathrm{ft}
$$

38. The length of $\overline{A B}$ is 6 mm the length of $\overline{B C}$ is 8 mm and the length of $\overline{D C}$ is 50 mm . Find the length of $\overline{A D}$.

$$
\approx 50.990 \mathrm{~mm}
$$

## Lesson 8.4

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

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

2. $(-2,-5)$ and $(3,-8) \approx 5.831$ units

3. $(3,-2)$ and $(5,0)$
$\approx 2.828$ units

4. $(-3,3)$ and $(2,-9) \quad 13$ units

5. $(-3,-3)$ and $(3,3) \approx 8.485$ units

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

18 units

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

11. $(-4,6)$ and $(6,2)$

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

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

5 units

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

14 units

12. $(2,4)$ and $(5,-2)$
$\approx 6.708$ units

14. $(-5,4)$ and $(7,3)$
$\approx 12.042$ units
15. $(-9,-3)$ and $(-4,4) \approx 8.602$ units

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

16. $(2,-4)$ and $(5,4)$
$\approx 8.544$ units

18. $(-8,7)$ and $(7,-5)$
$\approx 19.209$ units


## Lesson 8.5

## Answer the following questions either using $\pi \approx 3.14$ or giving your answer in terms of $\pi$. 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 .

$$
200 \pi \mathrm{~mm}^{3} \approx 628 \mathrm{~mm}^{3}
$$

3. Find the volume of a cylinder with a radius of 5 cm and a height of 15 cm .

$$
375 \pi \mathrm{~cm}^{3} \approx 1177.5 \mathrm{~cm}^{3}
$$

4. Find the volume of a cylinder with a diameter of 22 m and a height of 5 m .

$$
605 \pi \mathrm{~m}^{3} \approx 1899.7 \mathrm{~m}^{3}
$$

5. Find the volume of a cylinder with a diameter of 4 ft and a height of 1 ft .

$$
4 \pi f t^{3} \approx 12.56 f t^{3}
$$

6. Find the volume of a cylinder with a radius of 9 in and a height of 9 in .

$$
729 \pi i n^{3} \approx 2289.06 i n^{3}
$$

7. Find the volume of a can of green beans with a radius of 3 cm and a height of 8 cm .

$$
72 \pi \mathrm{~cm}^{3} \approx 226.08 \mathrm{~cm}^{3}
$$

8. Find the volume of a cylindrical can of oatmeal with a radius of 8 cm and a height of 45 cm .

$$
2880 \pi \mathrm{~cm}^{3} \approx 9043.2 \mathrm{~cm}^{3}
$$

9. Find the volume of a cylindrical water bottle with a diameter of 4 cm and a height of 30 cm .

$$
120 \pi \mathrm{~cm}^{3} \approx 376.8 \mathrm{~cm}^{3}
$$

10. Find the volume of a can of Pepsi with a diameter of 2 in and a height of 3.5 in .

$$
3.5 \pi \mathrm{in}^{3} \approx 10.99 \mathrm{in}^{3}
$$

11. Find the volume of a water pipe with a radius of 0.75 ft and a length of 16 ft .

$$
9 \pi f t^{3} \approx 28.26 f t^{3}
$$

12. Find the volume of a straw used for drinking with a radius of 2 mm and a height of 170 mm .

$$
680 \pi \mathrm{~mm}^{3} \approx 2135.2 \mathrm{~mm}^{3}
$$

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

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


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

$$
100 \pi \mathrm{~mm}^{3} \approx 314 \mathrm{~mm}^{3}
$$

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

$$
125 \pi \mathrm{~cm}^{3} \approx 392.5 \mathrm{~cm}^{3}
$$

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

$$
240 \pi \mathrm{~m}^{3} \approx 753.6 \mathrm{~m}^{3}
$$

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

$$
12 \pi f t^{3} \approx 37.68 f t^{3}
$$

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

$$
243 \pi \mathrm{in}^{3} \approx 763.02 \mathrm{in}^{3}
$$

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

$$
64 \pi \mathrm{~cm}^{3} \approx 200.96 \mathrm{~cm}^{3}
$$

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

$$
12 \pi \mathrm{in}^{3} \approx 37.68 \mathrm{in}^{3}
$$

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

$$
75 \pi \mathrm{~cm}^{3} \approx 235.5 \mathrm{~cm}^{3}
$$


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

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

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

$$
972 \pi \mathrm{~mm}^{3} \approx 3052.08 \mathrm{~mm}^{3}
$$

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

$$
288 \pi \mathrm{~cm}^{3} \approx 904.32 \mathrm{~cm}^{3}
$$

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

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

26. Find the volume of a sphere with a radius of $2 f t$.

$$
10.67 \pi f t^{3} \approx 33.49 f t^{3}
$$

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

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

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

$$
57.17 \pi \mathrm{in}^{3} \approx 179.51 \mathrm{in}^{3}
$$

29. Find the volume of the Earth with a diameter of approximately $12,756 \mathrm{~km}$.

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

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

$$
6.99 \times 10^{9} \pi \mathrm{~km}^{3} \approx 2.20 \times 10^{10} \mathrm{~km}^{3}
$$

31. Find the volume of a gumball with a radius of 3 mm .
$36 \pi \mathrm{~mm}^{3} \approx 113.04 \mathrm{~mm}^{3}$

## Lesson 8.6

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

1. Find the height of a cylinder with a volume of $30 \mathrm{in}^{3}$ and a radius of 1 in .

$$
h \approx 9.55 \mathrm{in}
$$

2. Find the height of a cylinder with a volume of $100 \mathrm{~cm}^{3}$ and a radius of 2 cm .

$$
h \approx 7.96 \mathrm{~cm}
$$

3. Find the height of a cylinder with a volume of $720 \pi f t^{3}$ and a radius of 6 ft . $h=20 \mathrm{ft}$
4. Find the height of a cylinder with a volume of $1215 \pi \mathrm{~mm}^{3}$ and a radius of 9 mm .

$$
h=15 \mathrm{~mm}
$$

5. Find the radius of a cylinder with a volume of $950 \mathrm{in}^{3}$ and a height of 10 in .

$$
r \approx 5.5 \mathrm{in}
$$

6. Find the radius of a cylinder with a volume of $208 \mathrm{~cm}^{3}$ and a height of 4 cm .

$$
r \approx 4.07 \mathrm{~cm}
$$

7. Find the radius of a cylinder with a volume of $108 \pi f t^{3}$ and a height of 12 ft .

$$
r=3 \mathrm{ft}
$$

8. Find the radius of a cylinder with a volume $686 \mathrm{~mm}^{3}$ and a height of 14 mm .

$$
r \approx 3.95 \mathrm{~mm}
$$

9. Find the height of a cone with a volume of $150 \mathrm{in}^{3}$ and a radius of 10 in .

$$
h \approx 1.43 \mathrm{in}
$$

10. Find the height of a cone with a volume of $21 \mathrm{ft}^{3}$ and a radius of 4 ft .

$$
h \approx 1.25 \mathrm{ft}
$$

11. Find the radius of a cone with a volume of $175 \mathrm{~cm}^{3}$ and a height of 21 cm .

$$
r \approx 2.82 \mathrm{~cm}
$$

12. Find the radius of a cone with a volume of $196 \pi \mathrm{~mm}^{3}$ and a height of 12 mm .

$$
r=7 \mathrm{~mm}
$$

13. Find the radius of a sphere with volume $\approx 113.04 \mathrm{in}^{3}$.

$$
r=3 \mathrm{in}
$$

14. Find the radius of a sphere with volume $\approx 904.32 \mathrm{~cm}^{3}$.
$r=6 \mathrm{~cm}$
15. Find the radius of a sphere with volume $\approx 3052.08 \mathrm{~m}^{3}$.

$$
r=9 m
$$

16. Find the radius of a sphere with volume $\approx 4.18 \overline{6} \mathrm{ft}^{3}$.

$$
r=1 \mathrm{ft}
$$

## Lesson 8.7

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



Visual for questions 1-10

1. Find the volume of a cone used for the tip of a rocket with a diameter of $12 y d s$ and a height of $15 y d s$.

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

2. 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 .

$$
3.75 \pi \mathrm{~cm}^{3} \approx 11.78 \mathrm{~cm}^{3}
$$

3. 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 .

$$
9 \pi i n^{3} \approx 28.26 i n^{3}
$$

4. 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 .

$$
84 \pi \mathrm{~cm}^{3} \approx 263.76 \mathrm{~cm}^{3}
$$

5. 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 .

$$
348 \pi \mathrm{~mm}^{3} \approx 1092.72 \mathrm{~mm}^{3}
$$

6. 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 .

$$
7 \pi f t^{3} \approx 21.98 f t^{3}
$$

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

$$
r \approx 3.16 \mathrm{~mm}
$$

8. Find the radius of a model rocket with a volume of $2500 \mathrm{in}^{3}$, a cone height of 6 in , and a cylinder height of 25 in.

$$
r \approx 5.43 \mathrm{in}
$$

9. Find the cylinder height of a caulking gun with a volume of $300 \mathrm{in}^{3}$, a cone height of 6 in , and a radius of 2 in .

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

10. Find the cone height of a pencil with a volume of $750 \mathrm{~mm}^{3}$, a radius of 3 mm , and a cylinder height of 25 mm .

$$
h \approx 4.62 \mathrm{~mm}
$$


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 .

$$
99 \pi f t^{3} \approx 310.86 f t^{3}
$$

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 .

$$
828 \pi m^{3} \approx 2599.92 \mathrm{~m}^{3}
$$


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 .

$$
153 \pi \mathrm{~m}^{3} \approx 480.42 \mathrm{~m}^{3}
$$

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 .

$$
333 \pi f t^{3} \approx 1045.62 f t^{3}
$$

