

My academic goal for this unit is...

Check for Understanding Key:

- Understanding at start of the unit
- | Understanding after practice
- ▲ Understanding before unit test

LEARNING TARGETS	How is my understanding?	Test Score	Retake?
12a I can describe the trigonometric ratios.	_____ 1 2 3 4		
12b I can apply the trigonometric ratios to determine unknown angle measures and side lengths.	_____ 1 2 3 4		
12c I can apply trigonometric ratios to solve problems.	_____ 1 2 3 4		
12d I can describe the law of sines and apply it to solve problems.	_____ 1 2 3 4		
12e I can describe the law of cosines and apply it to solve problems.	_____ 1 2 3 4		

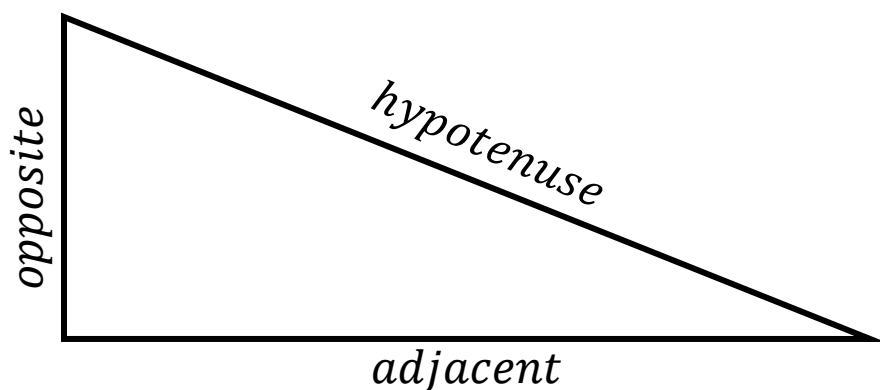
Are all squares similar to each other?

Are all rectangles similar to each other?

Are all right triangles similar to each other?

DP/1 Developing Proficiency Not yet, Insufficient	CP/2 Close to Proficient Yes, but..., Minimal	PR/3 Proficient Yes, Satisfactory	HP/4 Highly Proficient WOW, Excellent
I can't do it and am not able to explain process or key points	I can sort of do it and am able to show process, but not able to identify/explain key math points	I can do it and able to both explain process and identify/explain math points	I'm great at doing it and am able to explain key math points accurately in a variety of problems

Unit 12 Definitions & Conjectures



<i>Title</i>	<i>Conjecture</i>	<i>Diagram</i>
Sine Ratio	In a right triangle, the sine ratio is.....	
Cosine Ratio	In a right triangle the cosine ratio is...	
Tangent Ratio	In a right triangle the tangent ratio is...	
SAS Triangle Area Conjecture	The area of a triangle is given by the formula $A =$ Where a and b are the lengths of two sides and C is the angle between them.	
Law of Sines	For a triangle with angles A, B, and C and sides of lengths a, b and c (a opposite A, b opposite B and c opposite C)... $\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$	

Unit 12 Definitions & Conjectures

Pythagorean Identity	For any angle A , $(\quad)^2 + (\quad)^2 = 1$	
Law of Cosines	For any triangle with sides of lengths a , b and c , and with C the angle opposite the side with length c , $c^2 = a^2 + b^2 - 2ab \cos C$	

Additional Notes:

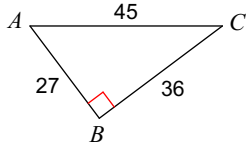
Notes

Notes

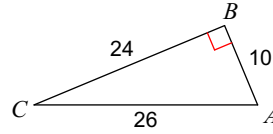
Practice: Trig. Ratios

Find the value of each trigonometric ratio.

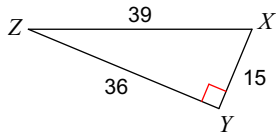
1) $\tan C$



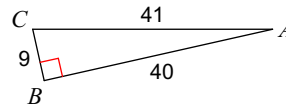
2) $\sin C$



3) $\cos Z$

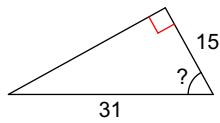


4) $\tan C$

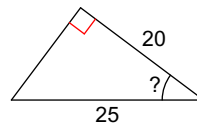


Find the measure of the indicated angle to the nearest degree.

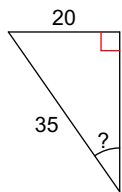
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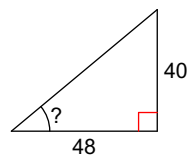
6)



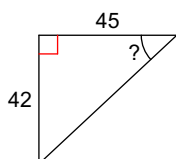
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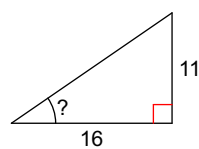
8)



9)



10)



Lesson 12.1 • Trigonometric Ratios

Name _____ Period _____ Date _____

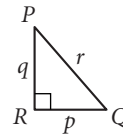
In Exercises 1–4, give each answer as a fraction in terms of p , q , and r .

1. $\sin P =$ _____

2. $\cos P =$ _____

3. $\tan P =$ _____

4. $\sin Q =$ _____



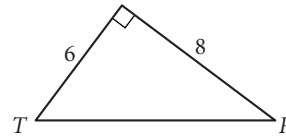
In Exercises 5–8, give each answer as a decimal accurate to the nearest 0.001.

5. $\sin T =$ _____

6. $\cos T =$ _____

7. $\tan T =$ _____

8. $\sin R =$ _____



For Exercises 9–11, solve for x . Express each answer accurate to the nearest 0.01.

9. $\cos 64^\circ = \frac{x}{28}$

10. $\sin 24^\circ = \frac{12.1}{x}$

11. $\tan 51^\circ = \frac{x}{14.8}$

For Exercises 12–14, find the measure of each angle to the nearest degree.

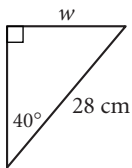
12. $\sin A = 0.9455$

13. $\tan B = \frac{4}{3}$

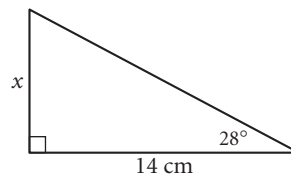
14. $\cos C = 0.8660$

For Exercises 15–17, write a trigonometric equation you can use to solve for the unknown value. Then find the value to the nearest 0.1.

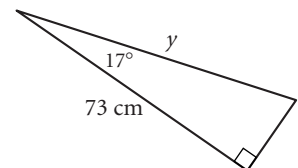
15. $w \approx$ _____



16. $x \approx$ _____

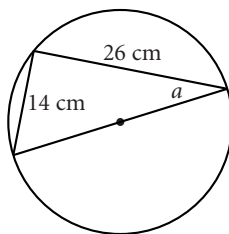


17. $y \approx$ _____

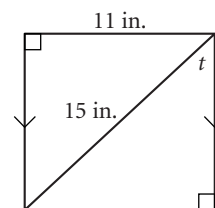


For Exercises 18–20, find the value of each unknown to the nearest degree.

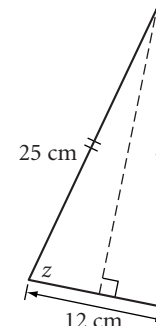
18. $a \approx$ _____



19. $t \approx$ _____



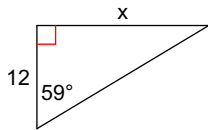
20. $z \approx$ _____



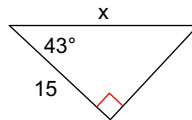
Practice: Solving Triangles with Trig.

Find the missing side. Round to the nearest tenth.

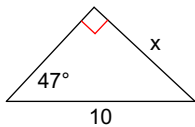
1)



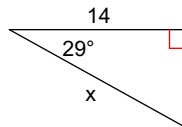
2)



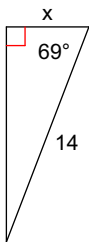
3)



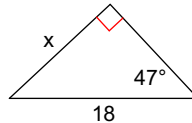
4)



5)

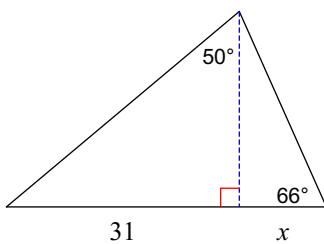


6)

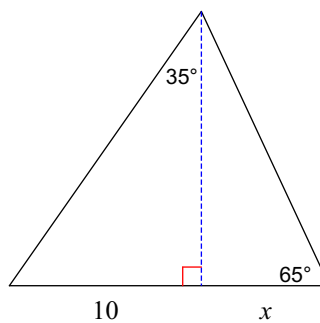


Find the length of the side labeled x . Round intermediate values to the nearest tenth. Use the rounded values to calculate the next value. Round your final answer to the nearest tenth.

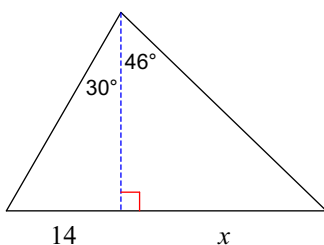
7)



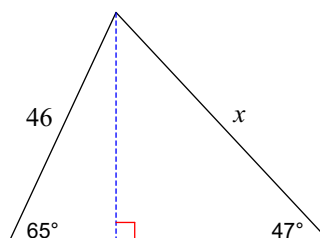
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9)

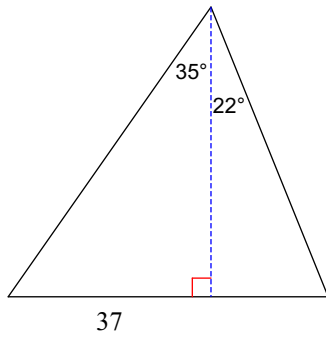


10)

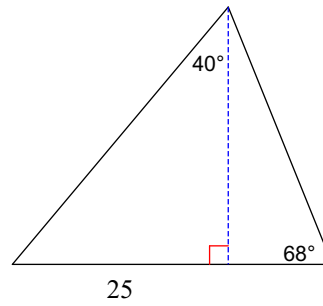


Find the area of each triangle. Round intermediate values to the nearest tenth. Use the rounded values to calculate the next value. Round your final answer to the nearest tenth.

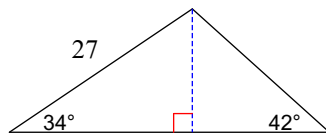
11)



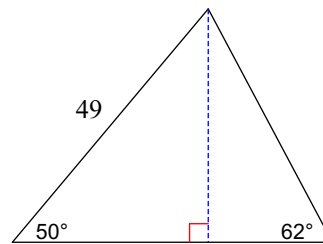
12)



13)

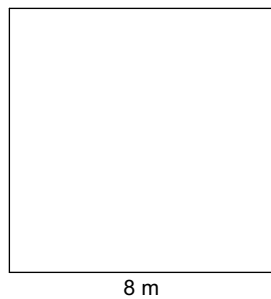


14)

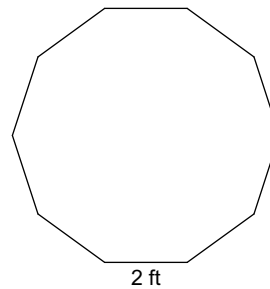


Find the area of each figure. Round your answer to the nearest tenth.

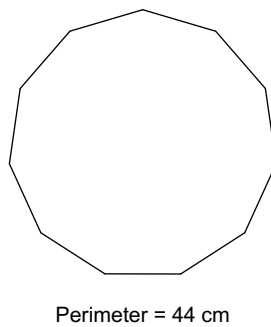
15)



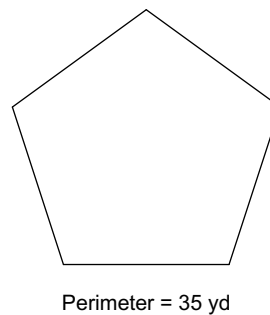
16)



17)



18)

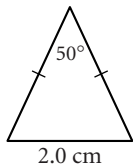


Lesson 12.2 • Problem Solving with Right Triangles

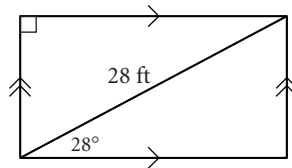
Name _____ Period _____ Date _____

For Exercises 1–3, find the area of each figure to the nearest square unit.

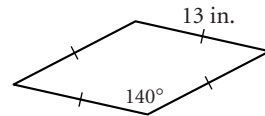
1. Area $\approx$ _____



2. Area $\approx$ _____



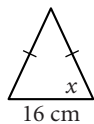
3. Area $\approx$ _____



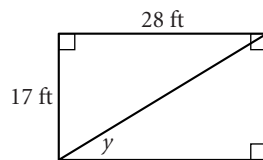
For Exercises 4–9, find each unknown to the nearest tenth of a unit.

4. Area = 88 cm^2

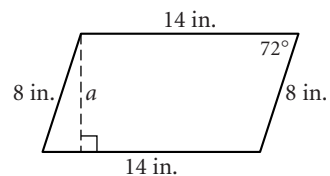
$x \approx$ _____



5. $y \approx$ _____

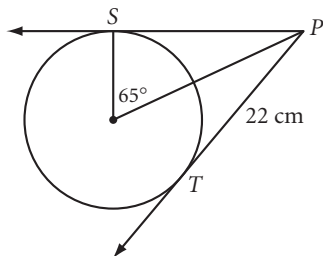


6. $a \approx$ _____



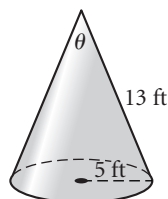
7. $\overrightarrow{PS}$ and $\overrightarrow{PT}$ are tangents.

Diameter $\approx$ _____



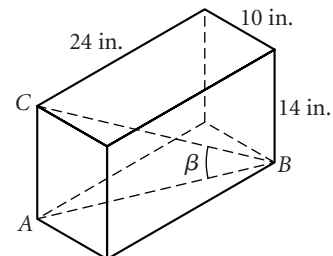
8. Right cone

$\theta \approx$ _____



9. Right rectangular prism

$m\angle ABC = \beta \approx$ _____



In Exercises 10–12, give each answer to the nearest tenth of a unit.

10. A ladder 7 m long stands on level ground and makes a 73° angle with the ground as it rests against a wall. How far from the wall is the base of the ladder?

11. To see the top of a building 1000 feet away, you look up 24° from the horizontal. What is the height of the building?

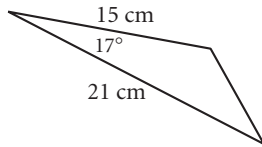
12. A guy wire is anchored 12 feet from the base of a pole. The wire makes a 58° angle with the ground. How long is the wire?

Lesson 12.3 • The Law of Sines

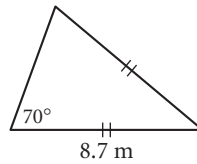
Name _____ Period _____ Date _____

In Exercises 1–3, find the area of each figure to the nearest square unit.

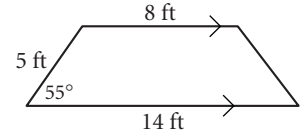
1. Area $\approx$ _____



2. Area $\approx$ _____

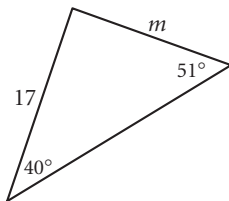


3. Area $\approx$ _____

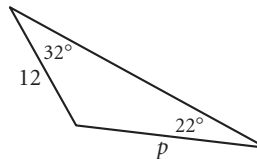


In Exercises 4–6, find each length to the nearest centimeter. All lengths are in centimeters.

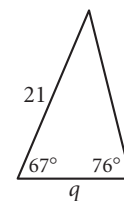
4. $m \approx$ _____



5. $p \approx$ _____



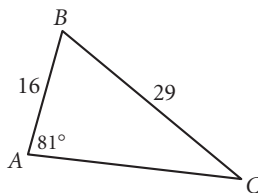
6. $q \approx$ _____



In Exercises 7–9, find the measure of each angle to the nearest degree.

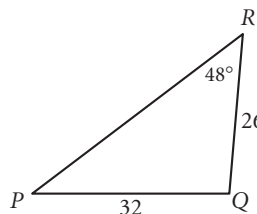
7. $m\angle B \approx$ _____

$m\angle C \approx$ _____



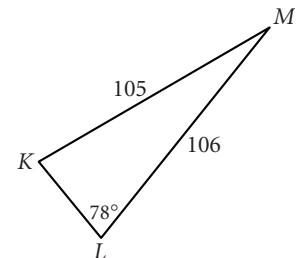
8. $m\angle P \approx$ _____

$m\angle Q \approx$ _____



9. $m\angle K \approx$ _____

$m\angle M \approx$ _____



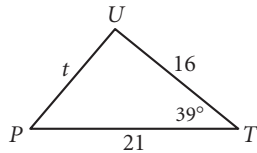
10. A large helium balloon is tethered to the ground by two taut lines. One line is 100 feet long and makes an 80° angle with the ground. The second line makes a 40° angle with the ground. How long is the second line, to the nearest foot? How far apart are the tethers?

Lesson 12.4 • The Law of Cosines

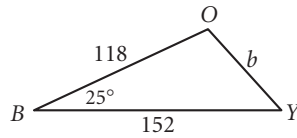
Name _____ Period _____ Date _____

In Exercises 1–3, find each length to the nearest centimeter. All lengths are in centimeters.

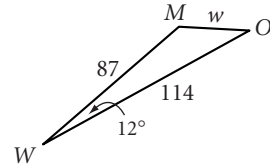
1. $t \approx$ _____



2. $b \approx$ _____



3. $w \approx$ _____

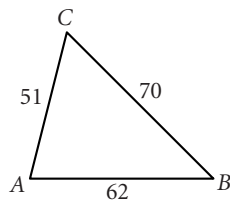


In Exercises 4–6, find each angle measure to the nearest degree.

4. $m\angle A \approx$ _____

$m\angle B \approx$ _____

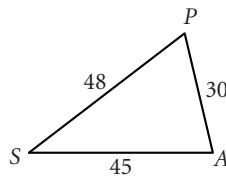
$m\angle C \approx$ _____



5. $m\angle A \approx$ _____

$m\angle P \approx$ _____

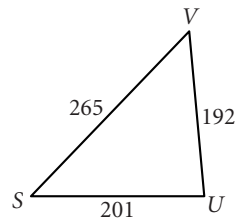
$m\angle S \approx$ _____



6. $m\angle S \approx$ _____

$m\angle U \approx$ _____

$m\angle V \approx$ _____



7. A circle with radius 12 in. has radii drawn to the endpoints of a 5 in. chord. What is the measure of the central angle?

8. A parallelogram has side lengths 22.5 cm and 47.8 cm. One angle measures 116° . What is the length of the shorter diagonal?

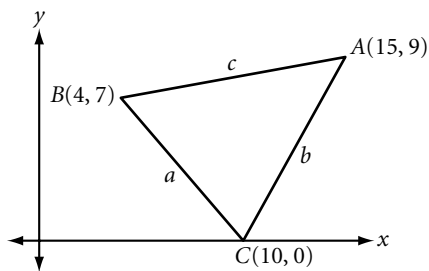
9. The diagonals of a parallelogram are 60 in. and 70 in. and intersect at an angle measuring 64° . Find the length of the shorter side of the parallelogram.

Lesson 12.5 • Problem Solving with Trigonometry

Name _____ Period _____ Date _____

1. While floating down a river with a 2.75 mi/h current, Alicia decides to swim directly toward the river bank. She can swim 0.75 mi/h in still water. What is the actual speed at which she moves toward the bank? At what angle will she approach the bank, measured with respect to the bank?

2. Find the measure of each angle to the nearest hundredth of a degree.



3. Two fire watchtowers 8.4 km apart spot a fire at the same time. Tower 1 reports the fire at a 36° angle measure from its line of sight to Tower 2. Tower 2 reports a 68° angle measure between the fire and Tower 1. How far is the fire from each tower?
4. Two airplanes leave O'Hare Airport in Chicago at the same time. One plane flies 280 mi/h at bearing 55° . The other plane flies 350 mi/h at bearing 128° . How far apart are the two planes after 2 hours 15 minutes?
5. Carla needs to fence her triangular plot of land. The angle between the two shorter sides measures 83° . The shortest side is 122 ft and the longest is 215 ft. How much fencing does Carla need? What is the area of her plot of land?

LESSON 12.1 • Trigonometric Ratios

- | | |
|--|---|
| 1. $\sin P = \frac{p}{r}$ | 2. $\cos P = \frac{q}{r}$ |
| 3. $\tan P = \frac{p}{q}$ | 4. $\sin Q = \frac{q}{r}$ |
| 5. $\sin T = 0.800$ | 6. $\cos T = 0.600$ |
| 7. $\tan T \approx 1.333$ | 8. $\sin R = 0.600$ |
| 9. $x \approx 12.27$ | 10. $x \approx 29.75$ |
| 11. $x \approx 18.28$ | 12. $m\angle A \approx 71^\circ$ |
| 13. $m\angle B \approx 53^\circ$ | 14. $m\angle C \approx 30^\circ$ |
| 15. $\sin 40^\circ = \frac{w}{28}$; $w \approx 18.0$ cm | |
| 16. $\sin 28^\circ = \frac{x}{14}$; $x \approx 7.4$ cm | |
| 17. $\cos 17^\circ = \frac{73}{y}$; $y \approx 76.3$ cm | |
| 18. $a \approx 28^\circ$ | 19. $t \approx 47^\circ$ 20. $z \approx 76^\circ$ |

LESSON 12.2 • Problem Solving with Right Triangles

- | | |
|---------------------------------------|---------------------------------------|
| 1. Area ≈ 2 cm ² | 2. Area ≈ 325 ft ² |
| 3. Area ≈ 109 in ² | 4. $x \approx 54.0^\circ$ |
| 5. $y \approx 31.3^\circ$ | 6. $a \approx 7.6$ in. |
| 7. Diameter ≈ 20.5 cm | 8. $\theta \approx 45.2^\circ$ |
| 9. $\beta \approx 28.3^\circ$ | 10. About 2.0 m |
| 11. About 445.2 ft | 12. About 22.6 ft |

LESSON 12.3 • The Law of Sines

- | | | |
|--|-------------------------------------|--------------------------------------|
| 1. Area ≈ 46 cm ² | 2. Area ≈ 24 m ² | 3. Area ≈ 45 ft ² |
| 4. $m \approx 14$ cm | 5. $p \approx 17$ cm | 6. $q \approx 13$ cm |
| 7. $m\angle B \approx 66^\circ$, $m\angle C \approx 33^\circ$ | | |
| 8. $m\angle P \approx 37^\circ$, $m\angle Q \approx 95^\circ$ | | |
| 9. $m\angle K \approx 81^\circ$, $m\angle M \approx 21^\circ$ | | |
| 10. Second line: about 153 ft, between tethers: about 135 ft | | |

LESSON 12.4 • The Law of Cosines

- | | |
|---|----------------------|
| 1. $t \approx 13$ cm | 2. $b \approx 67$ cm |
| 3. $w \approx 34$ cm | |
| 4. $m\angle A \approx 76^\circ$, $m\angle B \approx 45^\circ$, $m\angle C \approx 59^\circ$ | |
| 5. $m\angle A \approx 77^\circ$, $m\angle P \approx 66^\circ$, $m\angle S \approx 37^\circ$ | |
| 6. $m\angle S \approx 46^\circ$, $m\angle U \approx 85^\circ$, $m\angle V \approx 49^\circ$ | |

- | | |
|---------------------|------------------|
| 7. About 24° | 8. About 43.0 cm |
| 9. About 34.7 in. | |

LESSON 12.5 • Problem Solving with Trigonometry

- | |
|--|
| 1. About 2.85 mi/h; about 15° |
| 2. $m\angle A \approx 50.64^\circ$, $m\angle B \approx 59.70^\circ$, $m\angle C \approx 69.66^\circ$ |
| 3. About 8.0 km from Tower 1, 5.1 km from Tower 2 |
| 4. About 853 miles |
| 5. About 530 ft of fencing; about 11,656 ft ² |

Answers to Practice: Trig. Ratios

1) $\frac{3}{4}$

5) 61°

9) 43°

2) $\frac{5}{13}$

6) 37°

10) 35°

3) $\frac{12}{13}$

7) 35°

4) $\frac{40}{9}$

8) 40°

Answers to Practice: Solving Triangles with Trig.

1) 20.0

5) 5.0

9) 25.1

13) 296

17) 149.9 cm^2

2) 20.5

6) 13.2

10) 57

14) 963.8

18) 84.3 yd^2

3) 7.3

7) 11.6

11) 1539.1

15) 64 m^2

4) 16.0

8) 6.7

12) 551.3

16) 30.8 ft^2