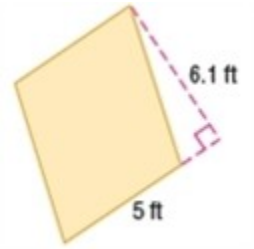
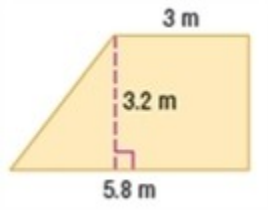
11-6 Area: Parallelograms, Triangles, and Trapezoids

Find the area of each figure.

1. 

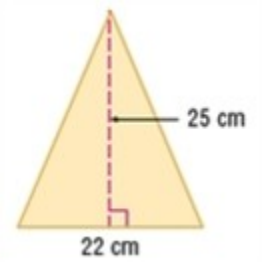
ANSWER:

30.5 ft^2

2. 

ANSWER:

14.08 m^2

3. 

ANSWER:

275 cm^2

4. parallelogram: base = 9.4 m, height = 7.6 m

ANSWER:

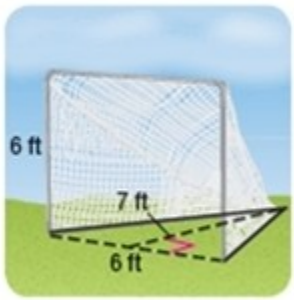
71.44 m^2

5. trapezoid: height = 16 in., bases = 3.1 in., 7.6 in.

ANSWER:

85.6 in^2

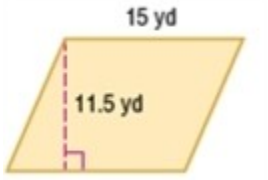
6. **LACROSSE** A lacrosse goal with net is shown. The goal is 6 feet wide, 6 feet high, and 7 feet deep. What is the area of the triangular region of the ground inside the net?



ANSWER:

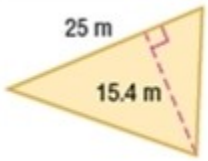
21 ft^2

Find the area of each figure.

7. 

ANSWER:

172.5 yd^2

8. 

ANSWER:

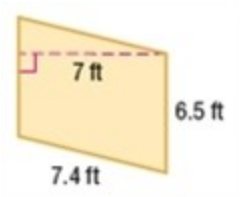
192.5 m^2

9. 

ANSWER:

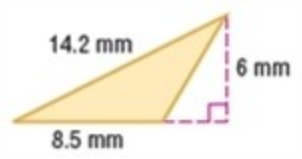
93.1 mi^2

11-6 Area: Parallelograms, Triangles, and Trapezoids

10. 

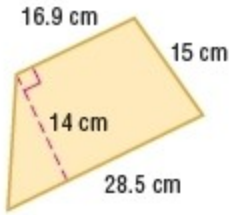
ANSWER:

45.5 ft^2

11. 

ANSWER:

25.5 mm^2

12. 

ANSWER:

317.8 cm^2

13. **HISTORY** Each face of the Mayan Pyramid of Kukulkan is a trapezoid with the approximate dimensions shown. What is the approximate area of one face of the structure?
(See page 665 of your text.)

ANSWER:

972.4 m^2

Find the area of each figure.

14. parallelogram: height = 9 mm, base = 5 mm

ANSWER:

45 mm^2

15. trapezoid: height = 6 cm, bases = 4 cm, 7 cm

ANSWER:

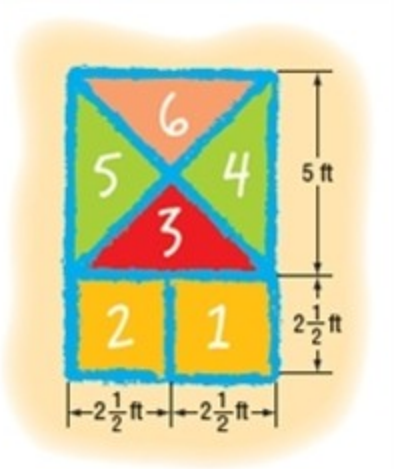
33 cm^2

16. triangle: base = 12 ft, height = 4.4 ft

ANSWER:

26.4 ft^2

17. **HOPSCOTCH** The first six steps of a hopscotch pattern are shown.



a. What is the area of triangle 5?
b. What is the area formed by triangles 3 and 4?

ANSWER:

a. 6.25 ft^2
b. 12.5 ft^2

Find the area of each figure.

18. parallelogram: base = 8.2 km, height = 5.2 km

ANSWER:

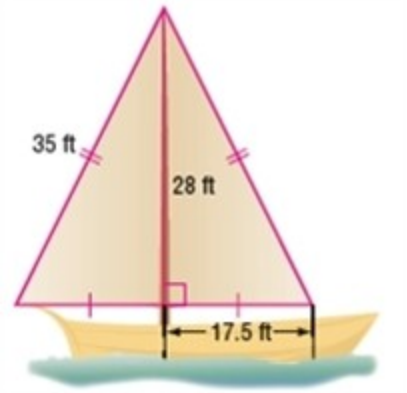
42.64 km^2

19. trapezoid: height = 2.4 m, bases = 7.9 m, 8.1 m

ANSWER:

19.2 m^2

20. **SAILS** The sail shown is formed from two congruent triangles. Find the area of the entire sail.



ANSWER:

490 ft^2

21. Find the base of a parallelogram with a height of 14.3 centimeters and an area of 128.7 square centimeters.

ANSWER:

9 cm

22. Suppose a triangle has an area of 32 square kilometers and a base of 12.8 kilometers. What is the height?

ANSWER:

5 km

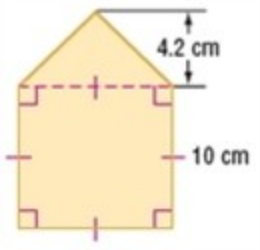
23. A trapezoid has an area of 26 square feet. What is the measure of the height if the bases measure 1.3 feet and 3.2 feet? Round to the nearest tenth.

ANSWER:

11.6 ft

Find the area of each figure.

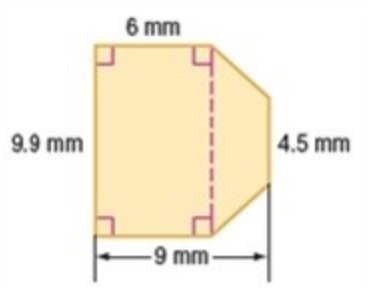
24.



ANSWER:

121 cm^2

25.



ANSWER:

81 mm^2

Find the area of each figure with the vertices shown.

26. rectangle: $A(-3, 4)$, $B(5, 4)$, $C(5, -1)$, $D(-3, -1)$

ANSWER:

40 $units^2$

27. parallelogram: $H(-2, -1)$, $I(0, 2)$, $J(5, 2)$, $K(3, -1)$

ANSWER:

15 $units^2$

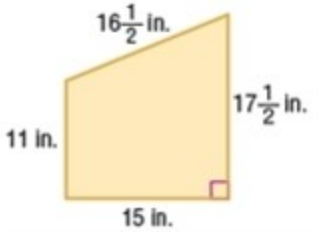
28. triangle: $E(-2.5, 2)$, $F(3, -2.5)$, $G(3, 2)$

ANSWER:

12.375 $units^2$

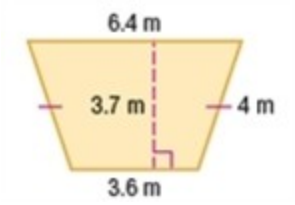
Find the perimeter and area of each trapezoid.

29.



ANSWER:

60 in.; 213.75 in^2

30. 

ANSWER:

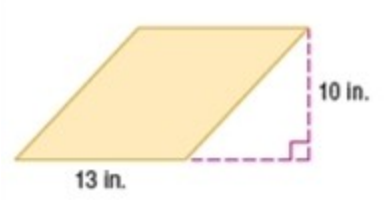
18 m; 18.5 m^2

31. **PAINTING** One wall of Tyve's room is in the shape of a trapezoid. The base of the wall is 12 feet wide. The top is 8 feet wide. The wall is 9 feet high. There is a rectangular window 2 feet by 3 feet. If she wants to paint the wall, what is the area that she needs to paint?

ANSWER:

84 ft^2

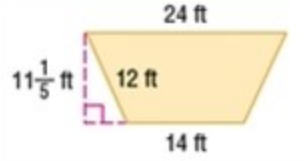
32. **MEASUREMENT** Find the area of the parallelogram below in square centimeters. Round to the nearest tenth. (*Hint*: 1 in. ≈ 2.54 cm)



ANSWER:

838.7 cm^2

33. **MEASUREMENT** Find the area of the trapezoid in square yards. Round to the nearest tenth. (*Hint*: 1 yd^2 = 9 ft^2)



ANSWER:

23.6 yd^2

34. **MULTIPLE REPRESENTATIONS** In this problem, you will explore the area of a figure when a dilation occurs.

a. Geometric Sketch and label a triangle with a base of 6 units and a height of 3 units.

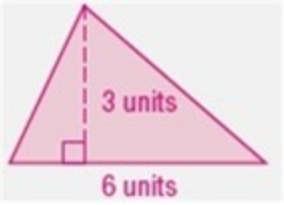
b. Tabular Make a table like the one shown. Find the area of each triangle.

Triangle	Base (in.)	Height (in.)	Area (in^2)
1	6	3	■
2	12	6	■
3	18	9	■

c. Analytical Describe how the area of a triangle changes if the dimensions are doubled and if the dimensions are tripled.

ANSWER:

a.



b.

Triangle	Base (in.)	Height (in.)	Area (in^2)
1	6	3	9
2	12	6	36
3	18	9	81

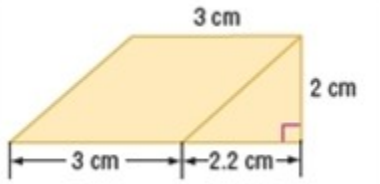
c. If the dimensions are doubled, the area is multiplied by 2 • 2 or 4. If the dimensions are tripled, the area is multiplied by 3 · 3 or 9.

35. **OPEN ENDED** Give an example of a triangle and a parallelogram that have the same area. Describe the bases and heights of each figure. State the area.

ANSWER:

Sample answer: a triangle with a base of 8 units and a height of 3 units has the same area as a parallelogram with a base of 4 units and a height of 3 units, 12 $units^2$.

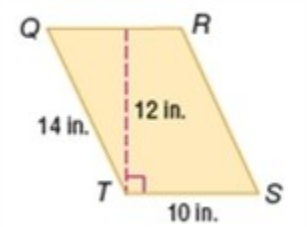
36. **ERROR ANALYSIS** Cameron and Lydia found the area of the trapezoid shown. Is either of them correct? Explain your reasoning.



ANSWER:

Lydia; Cameron incorrectly multiplied the bases rather than adding them.

37. **CHALLENGE** Refer to the parallelogram *QRST* shown.

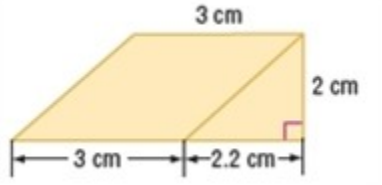


a. Describe a parallelogram that has the same area but a different perimeter than *QRST*. State the perimeter and area of the new parallelogram.
b. Describe a parallelogram that has the same perimeter but a different area than *QRST*. State the perimeter and area of the new parallelogram.

ANSWER:

a. Sample answer: a parallelogram with base 10 in., height 12 in., and sides 13 in.; 46 in., 120 in^2
b. Sample answer: a parallelogram with base 11 in., height 11 in., and sides 13 in.; 48 in., 121 in^2

38. **REASONING** Describe another method for finding the area of the trapezoid in Exercise 36.



ANSWER:

Sample answer: Find the area of the parallelogram and the area of the triangle and add:

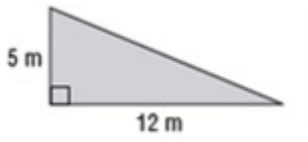
$A = (3)(2) + \frac{1}{2}(2.2)(2) = 8.2 \text{ cm}^2$.

39. **WRITING IN MATH** Describe how the formula for the area of a trapezoid is related to the formula for the area of a triangle.

ANSWER:

In the formula for the area of a triangle, $\frac{1}{2}$ is multiplied by the base and the height. The formula for the area of a trapezoid is the same, except that the sum of the bases is multiplied rather than a single base.

40. Find the area of the figure shown.



A 17 m^2
B 25 m^2
C 30 m^2
D 60 m^2

ANSWER:

C

41. **EXTENDED RESPONSE** Mrs. Watts wants to fertilize her lawn for spring. The fertilizer that she wants to buy indicates one bag will fertilize 1000 square feet.
a. List the steps that Mrs. Watts will need to follow to determine the number of bags she will need to purchase.
b. Suppose Mrs. Watts' lawn measures 90 feet by 150 feet. Calculate the number of bags of fertilizer she will need.

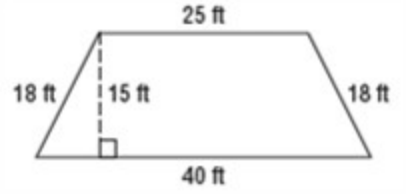
ANSWER:

a. She would need to determine the area of the lawn that she is going to fertilize. After finding the total area, she will then divide that by 1000 square feet to determine how many bags she needs to buy.
b. $90 \bullet 150 = 13,500$
13,500 ÷ 1000 = 13.5 so she would need to buy 14 bags of fertilizer.

42. Square *X* has an area of 9 square feet. The sides of square *Y* are twice as long as the sides of square *X*. Find the area of square *Y*.
F 36 ft^2
G 18 ft^2
H 9 ft^2
J 6 ft^2

ANSWER:
F

43. An architect designed a room that was in the shape of a trapezoid. She wants to figure the amount of carpet that will be needed for the room. Use the room's dimensions shown to determine the amount of carpet needed.



A 432.5 ft^2
B 487.5 ft^2
C 585 ft^2
D 607.5 ft^2

ANSWER:
B

Find the measure of an interior angle of each polygon.

44. regular pentagon

ANSWER:
108°

45. regular heptagon

ANSWER:
about 128.6°

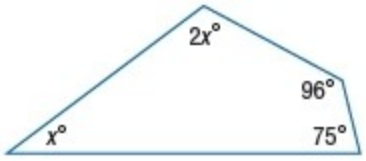
46. regular quadrilateral

ANSWER:
90°

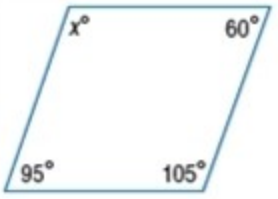
47. regular 12-gon

ANSWER:
150°

Find the value of *x*. Then find the missing angle measures.

48.


ANSWER:
63; 63°, 126°

49.


ANSWER:
100; 100°

Find the discount to the nearest cent.

50. $85 cell phone, 20% off

ANSWER:
$17

51. $489 desk, 15% off

ANSWER:
$73.35

52. 25% off a $74 baseball glove

ANSWER:
$18.50

53. 

ANSWER:
$16.25

Use a calculator to find each product. Round to the nearest tenth.

54. 3.14 • 6

ANSWER:
18.8

55. 2 • 3.14 • 5.4

ANSWER:
33.9

56. 3.14 • 2.2

ANSWER:
6.9

57. 3.14 • 4.3

ANSWER:
13.5