Name: _____ Period: _____ Date: _____

CCGPS Math 6th Grade Unit 5 Study Guide — Area & Volume

Solve real-world and mathematical problems involving area, surface area, and volume.

Formulas (Use as Needed)

Circumference

$C = \pi d$ or $C = 2\pi r$ $\pi = 3.14$

Area

Rectangle $A = bh$ or $A = lw$

Triangle $A = \frac{1}{2}bh$

Circle $A = \pi r^2$

Pythagorean Theorem

$a^2 + b^2 = c^2$

Mean

$$\overline{x} = \frac{x_1 + x_2 + x_3 + \ldots + x_n}{n}$$

Mean Absolute Deviation

$$\frac{\text{Total Distance (of all values from the mean value)}}{\text{Number of values}}$$

Interquartile Range: the difference between the first quartile and third quartile of a set of data

Volume

Rectangular Prism Volume = (area of base) × (height) or $V = lwh$

Cylinder   Volume = (area of base) × (height)

Sphere $V = \frac{4}{3}\pi r^3$

Cone $V = \frac{1}{3}Bh$

MCC6.G.1

☐ *Find areas of right, equilateral, isosceles, and scalene triangles, and special quadrilaterals*
☐ *Find areas of composite figures and polygons by composing into rectangles and decomposing into triangles and other shapes*
☐ *Solve real-world and mathematical problems involving area*

1. A square has a side length of 9 cm. What is its area? 81 cm²
2. A triangle has a base of 5 cm and a height of 3 cm. What is its area? 7.5cm²
3. A landscaper wants to create an area as shown in the grid below covered with paving stones. What is the area to be covered?
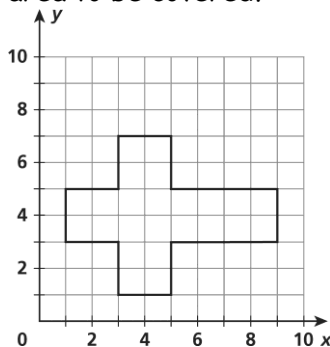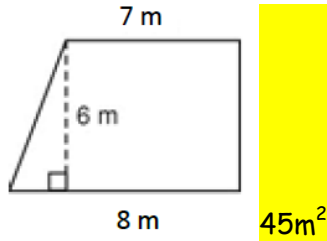

24 square units

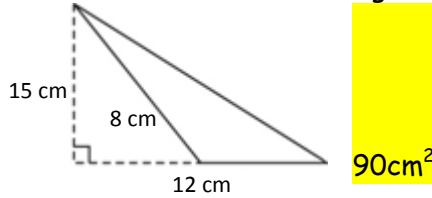4. A rectangle has a length of 6 in. and a width of 3 in. What is its area? $18in^2$
5. A triangle has a base of 8 ft and a height of 5 ft. What is its area? $20ft^2$
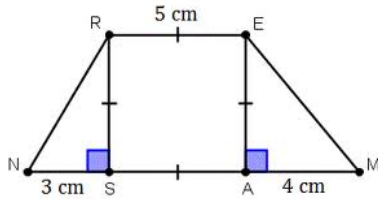6. What is the area of the trapezoid?

7 m

6 m

8 m $45m^2$

7. A triangle has a base of 24 yd and a height of 10 yd. What is its area? $120yd^2$
8. What is the area of the triangle?

15 cm

8 cm

12 cm $90cm^2$

9. Use your knowledge of finding area of triangles and rectangles to find the area of the following trapezoid.

5 cm
R   E

N
3 cm S   A 4 cm   M

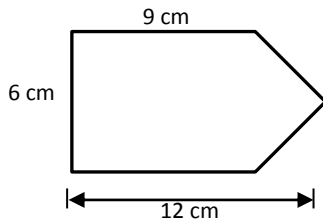a) 25 cm²   b) 60 cm²   c) 42.5 cm²   d) 40 cm²

10. What is the area of this figure?
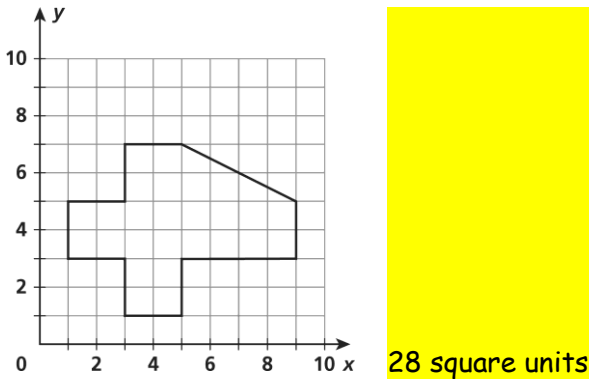
9 cm

6 cm

12 cm

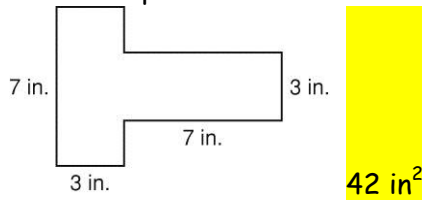a) 42 cm²   b) 63 cm²   c) 66 cm²   d) 72 cm²

11. A landscaper wants to create an area as shown in the grid below covered with paving stones. What is the area to be covered?
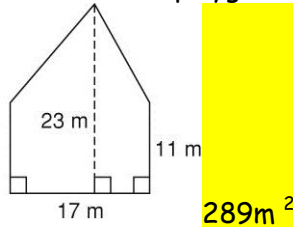
28 square units
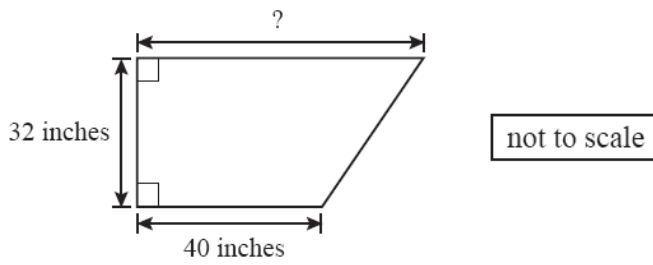
12. The floor plan below shows the Cruz family's basement.

7 in.   3 in.

7 in.

3 in.   **42 in²**

How many square feet of carpet are needed to cover the floor?

14. What is the area of the polygon?

23 m

11 m

17 m   **289m²**

Tim's Workbench

?

32 inches   not to scale

40 inches

16. Jessica wants to lay new grass in her backyard. The shape and dimensions of her backyard are shown below.

15 feet

9 feet

5 feet   3 feet

5 feet
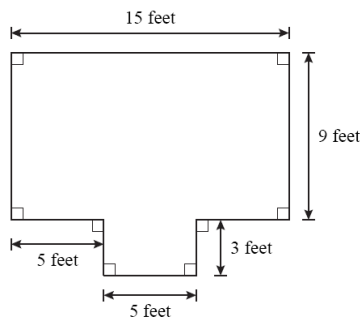
Jessica needs to know the area of backyard in order to know how much grass to purchase. What is the area, **in square feet**, of Jessica's backyard? **150 ft²**

MCC6.G.2
- ☐ *Measure and compute volume with fractional edge length using cubic units of measure*
- ☐ *Find the volumes of right rectangular prisms by substituting given values for their dimensions into the correct formulas*
- ☐ *Make the connection that finding the volume given the length (l) x width (w) is the same as the base (B)*
- ☐ *Solve real-world problems that require determining the volume of right rectangular prism*

For questions 17 – 19, use the shape below.

The **volume** of a prism is the number of cubic units it contains.
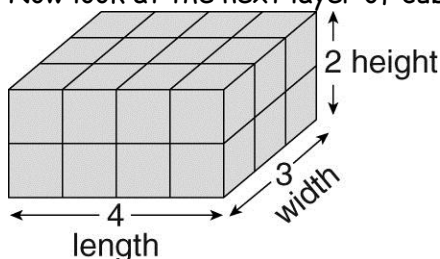Look at the first layer of cubic units in this rectangular prism.
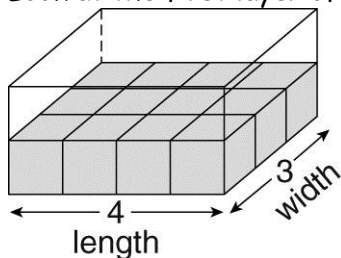
17. How many cubes long is the first layer? _____4_____
18. How many cubes wide is the first layer? _____3_____
19. How many cubes are in the first layer? _____12_____

For questions 20 – 24, use the shape below.

Now look at the next layer of cubes.

20. How many cubes long is the top layer? _____4_____
21. How many cubes wide is the top layer?_____3_____
22. How many cubes are in the top layer? _____12_____
23. What is the total number of cubes in both layers? _____24_____
24. What is the total volume of the rectangular prism? _____24_____
25. What is the volume of a rectangular prism with side lengths 12 in., 21 in., and 3 in.? $756in^3$

26. What is the volume of a rectangular prism with side lengths 5 in., $7\frac{1}{2}$ in., and $3\frac{3}{4}$ in.? $140.625in^3$
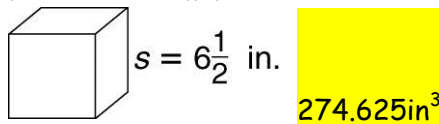
27. What is the volume of a rectangular prism with side lengths $4\frac{1}{3}$ m, 3 m, and $3\frac{1}{2}$ m? $45.5m^3$

28. Jordan is building a glass case for his pet turtle. The interior of the case is in the shape of a rectangular prism with the dimensions shown in the diagram.
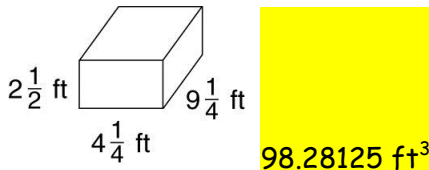

h feet

2 feet

11 feet

7ft
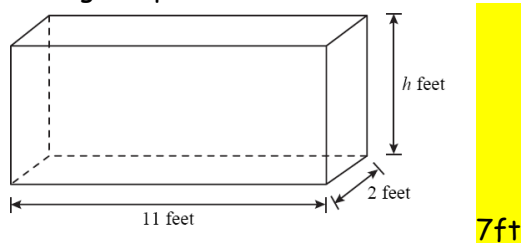
The total volume of the interior of the case is 154 cubic feet. What is the value of *h*?

29. Find the volume.

$s = 6\frac{1}{2}$ in.

$274.625in^3$

30. Find the volume.

$2\frac{1}{2}$ ft

$9\frac{1}{4}$ ft

$4\frac{1}{4}$ ft

98.28125 ft^3

31. What is the volume of the shape below?

$\frac{1}{2}h$

$\frac{1}{2}w$ $\frac{1}{2}l$
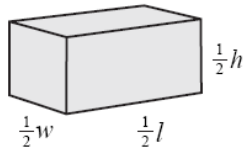
.125 or 1/8

32. Fawn built a sandbox that is 6 feet long, 5 feet wide, and $2\frac{1}{2}$ foot tall. How many cubic feet of sand does she need to fill the box? 75ft³

33. If the width of the sandbox was reduced by 1 foot, how much sand would be needed to fill the sandbox based on the new dimensions. 60ft³

MCC6.G.4
- ☐ *Decipher and draw views of rectangular and triangular prisms from a variety of perspectives*
- ☐ *Recognize and construct nets for rectangular and triangular prism and pyramids*
- ☐ *Find the surface area of rectangular and triangular prisms and pyramids by using manipulatives and by constructing nets*
- ☐ *Determine the surface area of rectangular and triangular prisms and pyramids by substituting given values for their dimensions into the correct formulas;*
- ☐ *Solve real-world that require determining the surface area of rectangular and triangular prisms and pyramids*
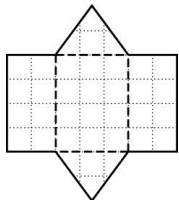
34. Name the solid figure created by the net and calculate the surface area.
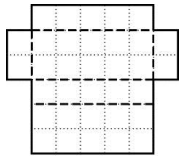
☐ = 1 ft²   Rectangular Prism SA = 34ft²

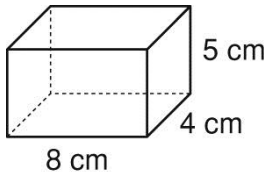35. Name the solid figure created by the net and calculate the surface area.
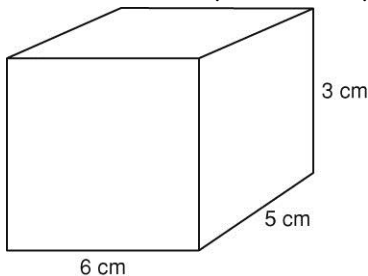
☐ = 1 in²   Triangular Prism SA = 34ft²
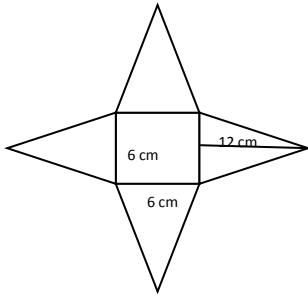
36. What is the **surface area** of this figure?

5 cm
4 cm
8 cm

184 cm²

37. What is the surface area of this figure?

3 cm
5 cm
6 cm

126 cm²

38. What is the surface are of the figure below?

6 cm
12 cm
6 cm
6 cm
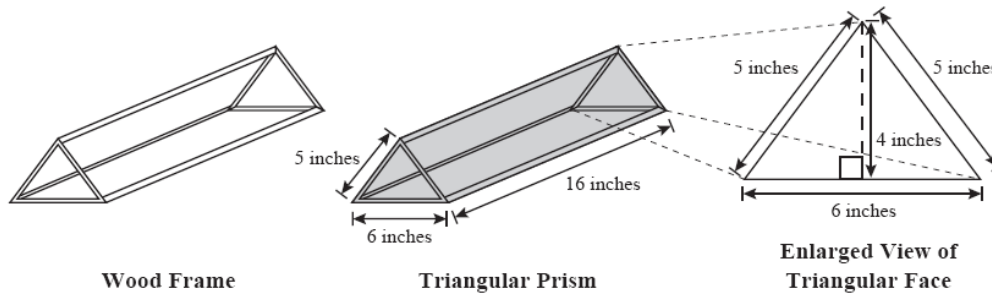
a) 36 square cm   b) 72 square cm   c) **180 square cm**   d) 360 square cm

39. Find the surface area of the below figure.

12 m
9 m

297m²

40. Alana made a wood frame and covered it with red felt material to create a triangular prism, as shown below.

Wood Frame

Triangular Prism

5 inches
16 inches
6 inches

Enlarged View of
Triangular Face

5 inches   5 inches
4 inches
6 inches

What is the total surface area, **in square inches**, of the prism?

280in²

41. Ms. Juarez will construct a sculpture that is a pyramid. This is the sketch of the sculpture.

4 ft
5 ft   5 ft

65ft²