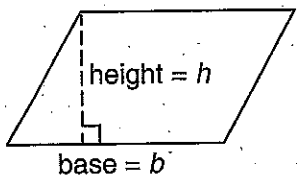
Name _____ Date _____

Geometry

Modeled Instruction

DIRECTIONS: Read each question and choose the best answer. Use the answer sheet provided at the end of the workbook to record your answers. If the correct answer is not available, mark the letter for "Not Here."

1. Find the area of the parallelogram.



$h = 6$ cm, $b = 8$ cm

A 14 square centimeters

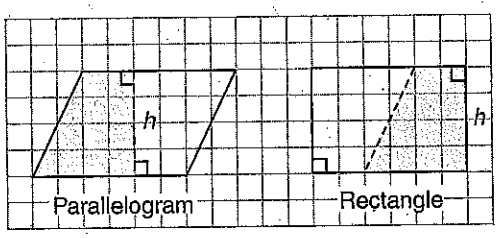
B 24 square centimeters

C 28 square centimeters

D 48 square centimeters

Hint

If you decompose a parallelogram into two congruent right trapezoids and use them to compose a rectangle, the two figures have the same area. Thus you can use the formula $A = b \times h$ to find the area of a rectangle and a parallelogram.



- The dashed line on the parallelogram is perpendicular to the base and divides the figure into two congruent pieces.
- If the shaded piece is moved to the right, the two pieces form a rectangle with *exactly* the same area.

Notice that the height of a parallelogram is *not* the length of one of its sides. It is the perpendicular distance from the base to the opposite side.

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69. A parking garage charges $2.00 for the first hour and $0.50 for each fraction of an hour thereafter. Which statement describes the relationship between the parking fee and the amount of time a person parks in the garage?

A The parking fee depends on the amount of time a person uses the garage.

B The amount of time a person uses the garage depends on the parking fee.

C The parking fee and the amount of time a person uses the garage are independent.

D The relationship cannot be determined.

70. Tanya walks dogs. She earns $8.75 for each dog she walks. She wants to go to a concert that costs $70.00. Write an equation relating the number of dogs she needs to walk to the amount of money she wants to earn. Let n be the number of dogs Tanya walks.

F $\frac{8.75}{n} = 70$

G $8.75n = 70$

H $8.75 - n = 70$

J $8.75 + n = 70$

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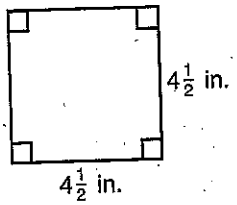
2. Find the area of the square.



F 9 square inches

G 18 square inches

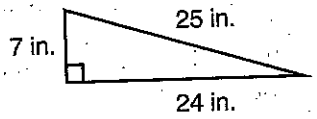
H $20\frac{1}{4}$ square inches

J $40\frac{1}{2}$ square inches

Hint

A square is a special type of rectangle with all sides equal. You can use the formula $A = bh$, or you can use this formula: $A = s \times s$, or $A = s^2$.

3. Find the area of the right triangle.



A 42 square inches

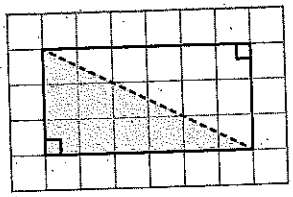
B 56 square inches

C 84 square inches

D 168 square inches

Hint

The area of a right triangle is $\frac{1}{2}$ the area of a rectangle with the same base and height. On the rectangle below, a diagonal decomposes it into two congruent right triangles. Since the two triangles are congruent, the area of each triangle must be $\frac{1}{2}(b \times h)$. In right triangles, the height is the same as the length of one of the sides.



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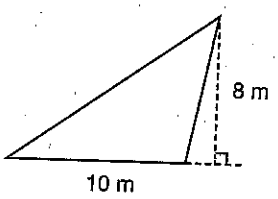
4. Find the area of the triangle.



F 18 m^2 **G** 36 m^2 **H** 40 m^2 **J** 80 m^2

Hint

The *height* of a triangle is the perpendicular distance from the base to the vertex opposite the base. When the height is not a side of the triangle, a dashed line represents the height. For obtuse triangles, the height may be shown outside of the triangle. Extend the base just far enough to draw a perpendicular line to the opposite vertex. The length of the extended portion of the base is *not* used when calculating the area of the triangle.

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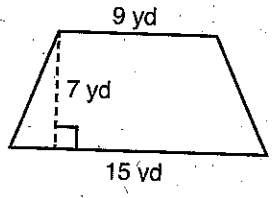
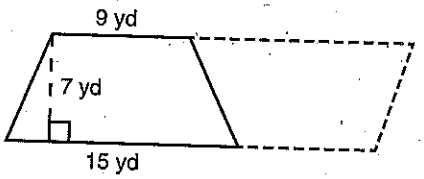
5. Find the area of the trapezoid.



A $31\frac{1}{2}$ sq yd **B** $52\frac{1}{2}$ sq yd **C** 63 sq yd **D** 84 sq yd

Hint

If you flip the trapezoid to the right, you compose a parallelogram made from 2 congruent trapezoids. Find the area of the parallelogram, and then divide by 2 to get the area of the trapezoid.



$b_1 = 15$ yd $b_2 = 9$ yd

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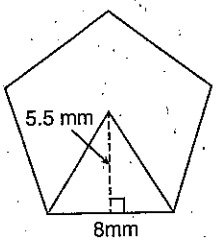
6. Find the area of the regular polygon below.



F 200 mm^2

G 110 mm^2

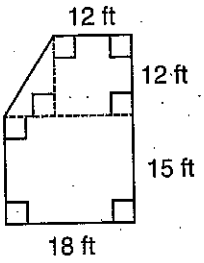
H 67.5 mm^2

J 40 mm^2

Hint

A regular polygon has congruent sides and congruent angles. You can decompose any regular polygon into congruent triangles by drawing a line from the center of the polygon to each vertex. To find the area of the polygon, find the area of one of the triangles. Then multiply by the number of triangles formed.

7. The Nelsons will install new carpeting in their basement. Mr. Nelson made a drawing that shows the dimensions of the basement. Then he decomposed it into smaller figures.



What is the area of the basement?

A 486 sq ft

B 450 sq ft

C 432 sq ft

D 414 sq ft

Hint

The dashed lines decompose the shape into two squares and a triangle. There are two ways to find the total area.

Method 1

- Find the area of the rectangle, the square, and the triangle formed by the dashed lines.
- Add the three areas to find the total area.

Method 2

- Extend the left side up and the top to the left to form an 18 by 27 rectangle.
- Find the area of this rectangle.
- Then subtract the area of the triangle formed that is not a part of the basement.

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8. Rodney is making a game board in the shape of a regular hexagon. He divides the hexagon into congruent triangles, each with a base of 8 inches and a height of 7 inches. What is the area of the game board?

F 84 sq in. **G** 90 sq in. **H** 168 sq in. **J** 336 sq in.

Hint

A hexagon has 6 sides. Decompose it into 6 congruent triangles. Then use the formula $A = \frac{1}{2}(bh)$ to find the area of one triangle and multiply by 6.

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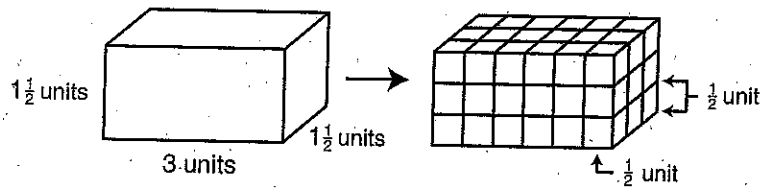
9. Devon finds the volume of a rectangular prism that is 3 units long, $1\frac{1}{2}$ units wide, and $1\frac{1}{2}$ units high by filling it with $\frac{1}{2}$-unit cubes.

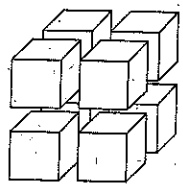


Then he removes the cubes and counts them. There are 54 cubes. What is the volume of the rectangular prism in cubic units?

A $6\frac{3}{4}$ cubic units **B** $13\frac{1}{2}$ cubic units **C** 54 cubic units **D** 27 cubic units

Hint

It takes 8 half-unit cubes to make 1 unit cube.



Divide 54 by 8 to find the volume of the rectangular prism in cubic units.

$54 \div 8 = \square$

Use the volume formula to check your answer:

$V = lwh = 3 \times 1\frac{1}{2} \times 1\frac{1}{2} = \square$

Both methods should yield the same volume.

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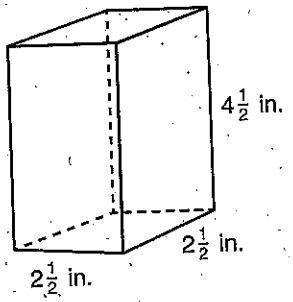
10. Find the volume of the rectangular prism.



F $9\frac{1}{2}$ cubic inches

G $16\frac{1}{8}$ cubic inches

H $28\frac{1}{8}$ cubic inches

J $33\frac{1}{4}$ cubic inches

Hint

Substitute the given values into the formula for the volume of a rectangular prism. Rename each measure as an improper fraction. Then multiply. Remember, the Associative Property of Multiplication states that the grouping of the factors does not affect their product, so multiply in the order that is easiest for you.

11. Find the volume of a cube that measures 3.5 centimeters on each side.

A 10.5 cu cm

B 27.125 cu cm

C 31.5 cu cm

D 42.875 cu cm

Hint

The sides (s) of a cube are equal in length. Because the length, width, and height of a cube are the same, you use the formula V of a cube $= s^3$.

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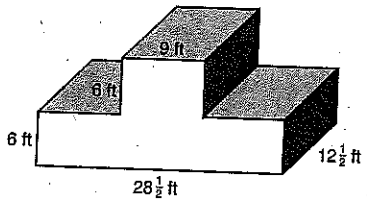
12. Find the volume of the composite solid figure.



F 675 cu ft

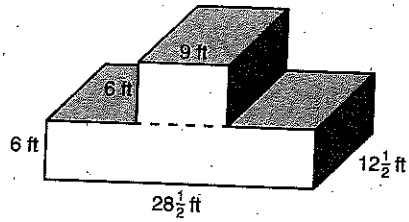
G 1,350 cu ft

H $2{,}812\frac{1}{2}$ cu ft

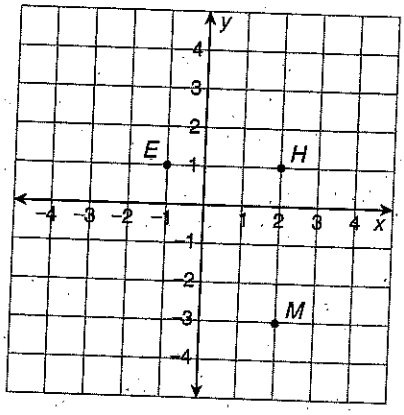
J $4{,}218\frac{3}{4}$ cu ft

Hint

Decompose the figure into rectangular prisms. Find the volume of each prism. Then add to find the total volume. Here is one way to decompose the figure.



13. Casper will place point F to complete rectangle $EHMF$. Where should he place point F?



A (1, 3)

B (1, −3)

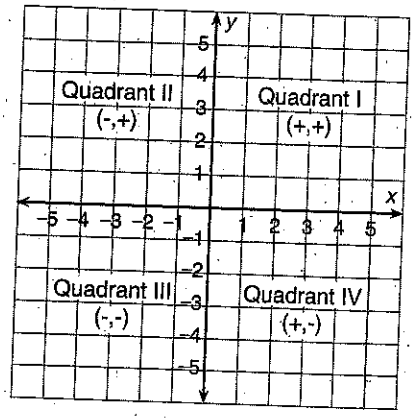
C (−1, −3)

D (−1, 3)

Hint

Side EF should be parallel to side HM. Point F will be directly below point E, and directly to the left of point M. This places it in Quadrant III. Use the signs for QIII.

For any point, if you know the quadrant in which a point is located, you also know the signs of its coordinates.



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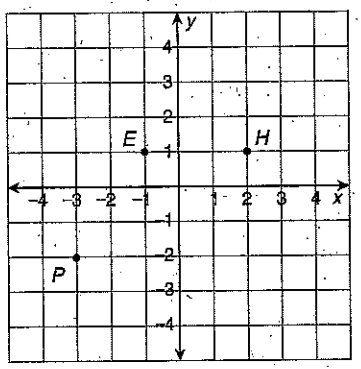
14. Anya draws points E, H, and P for isosceles trapezoid $EHMP$. Where should she place point M?



F (3, −2)

G (−3, −2)

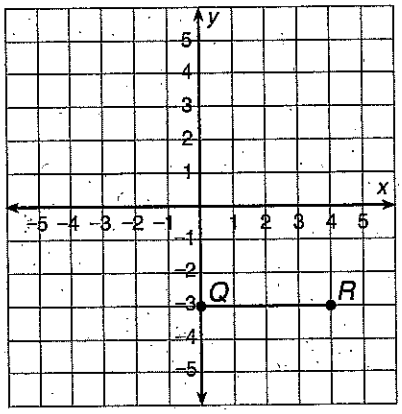
H (4, −2)

(−4, −2)

Hint

The location of point M must form a figure such that (1) side PM is parallel to side EH, and (2) side HM is the same length as side EP. One way to find the location of point M is to use logical reasoning: "I can get from point E to point P if I move 2 units to the left and 3 units down. So, I can get from point H to point M if I move 2 units to the right and 3 units down."

15. Felicia is drawing right triangle PQR on the graph below. Which could NOT be the location of point P?



A (0, 0)

B (1, 4)

C (4, 0)

D (4, −5)

Hint

A right triangle has two sides that are perpendicular. Point P must have an x-coordinate that is the same as the x-coordinate for point Q or point R.

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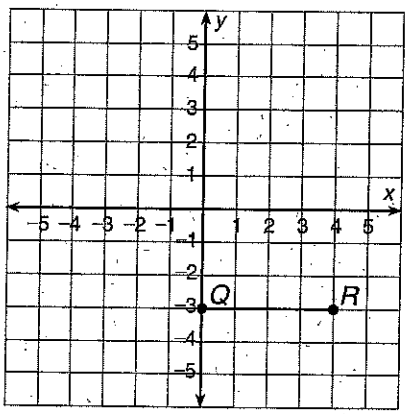
16. Suppose that Felicia placed point P at (4, 5) on the graph below. What is the length of side RP?



F 2 units

G 3 units

H 8 units

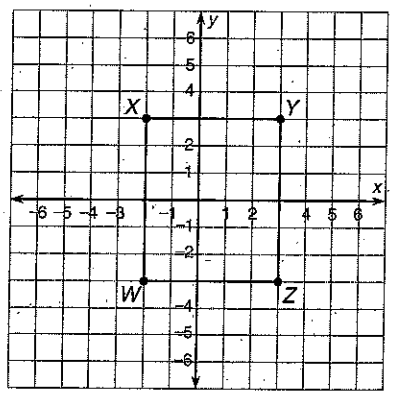
J 15 units

Hint

If P is at (4, 5) and R is at (4, −3), the two points are both 4 units to the right of the vertical axis (y-axis), and RP is a vertical line. To find the length of a *vertical line segment* using coordinates, add the y-coordinates. If the y-coordinates have different signs, add their absolute values.

(4, 5) $|5| = 5$
(4, −3) $|-3| = 3$
$5 + 3 = \square$, the length of RP

17. What are the dimensions of rectangle $WXYZ$?



A base: 5 units, height: 6 units

B base: 4 units, height: 3 units

C base: 3 units, height: 4 units

D base 2 units, height: 6 units

Hint

The top and bottom sides are horizontal lines. To find the length of a *horizontal line segment* using coordinates, add the x-coordinates. If the x-coordinates have different signs, add their absolute values.

$W(-2, -3)$ $|-2| = 2$
$Z(3, -3)$ $|-3| = 3$
$2 + 3 = \square$, the length of side WZ

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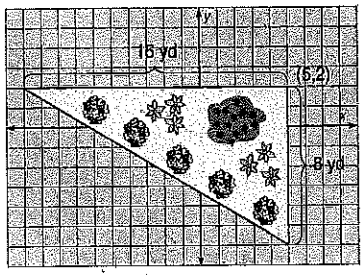
18. Reggie made this drawing of a corner flower garden for his yard. Then he mapped out the design on a coordinate plane. He placed the vertex for the right angle at (5, 2). What are the coordinates for the other vertices?



F (10, 2) and (5, 8)

G (−10, 2) and (5, −6)

H (15, −2) and (5, 6)

J (−15, 2) and (5, −8)

Hint

Use the given information: vertex at (5, 2), one leg = 15 yd, and one leg = 8 yd.
- Find the coordinates for a vertex that is 15 units directly to the left of (5, 2).
- Find the coordinates for a vertex that is 8 units directly below (5, 2).

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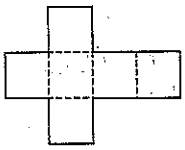
19. Mariana folds the net below along the dashed lines. Which term best names the solid figure formed from the net?



A rectangular prism **B** triangular prism **C** square pyramid **D** cube

Hint

A net is a two-dimensional representation of a three-dimensional figure. All six parts of the net are squares, so the net forms a 6-sided solid with each face shaped like a square.

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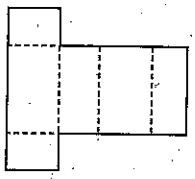
20. Which term names the solid figure formed from the net?



F rectangular prism

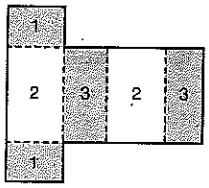
G square pyramid

H square prism

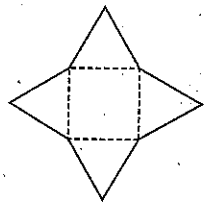
J Not Here

Hint

The net is made from six rectangles with three different dimensions. Visualize what the solid figure will look like when the net is folded up. You may find it helpful to number or shade the areas that have the same dimensions. When the net is folded into a solid figure, these areas will be opposite sides.



21. What solid figure can be made using this net?



A triangular pyramid

B triangular prism

C rectangular prism

D square pyramid

Hint

Make observations about the net. It is made up of 1 square and 4 triangles that appear to be congruent. Think: When folded, the r will form a solid figure with 1 square fa that is the base and 4 triangular faces that appear to meet at a point.

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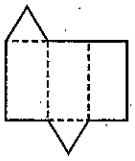
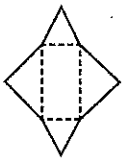
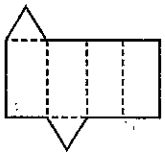
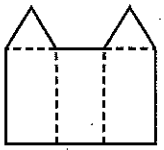
22. Which net can Derek use to make a triangular prism?

F 

G 

H 

J 

Hint

A triangular prism has exactly 2 congruent triangular faces and 3 rectangular faces. Identify any net that meets these conditions. Think: The triangular faces must be opposite of each other. Identify the net that, when folded, will meet this condition.

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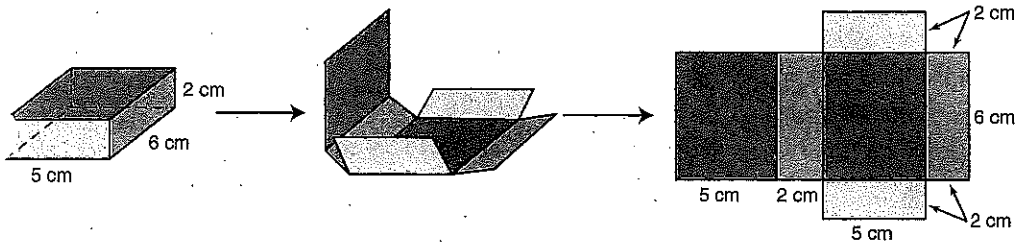
23. Demy needs to find the total surface area of a small box. She unfolds the box to make a net, as shown below.



What is the surface area of the box?

A 46 cm^2 **B** 52 cm^2 **C** 92 cm^2 **D** 104 cm^2

Hint

Surface area is the total area of the surface of a figure. Because the surfaces are flat, surface area is measured in square units. The box is a rectangular prism, so its opposite sides are congruent. Use the given information to find the dimensions of each surface. Then write and solve an equation to find the surface area.

Front/back faces:	Top/bottom faces:	Left/right faces:
5 cm × 2 cm	5 cm × 6 cm	6 cm × 2 cm

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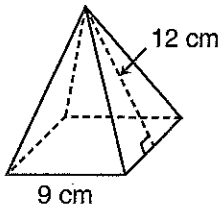
24. Find the surface area of the square pyramid below.



F 135 cm^2

G 216 cm^2

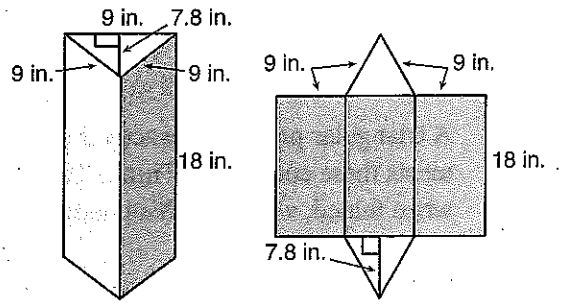
H 297 cm^2

J 540 cm^2

Hint

You may find it helpful to draw a net and label its dimensions. Find the *lateral surface area*, the area of the 4 triangular faces. Then add the area of the base.

25. Martin makes lampshades from rice paper and wire coat hangers. For the design below, the lampshade is open at both ends. How much rice paper will he need if he makes 2 lampshades using the design and pattern below?



A 486 sq in.

B 556.2 sq in.

C 972 sq in.

D 1,112.4 sq in.

Hint

The information given says that the lampshade is open at the top and the bottom, and that Martin will make two lampshades. Consider these conditions when you calculate how much rice paper is needed.