VideoText *Interactive*

Homeschool and Independent Study Sampler

Print Materials

for

"Geometry: A Complete Course"

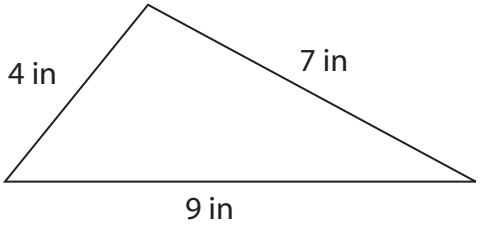
Unit I, Part C, Lesson 3 – "Triangles"

Course Notes (5 pages)
Student WorkText (3 pages)
Solutions Manual (2 pages)
Quizzes – Forms A and B (6 pages)
Quiz Solutions (6 pages)

Measuring Polygons (cont.)

Triangle

Perimeter (P)



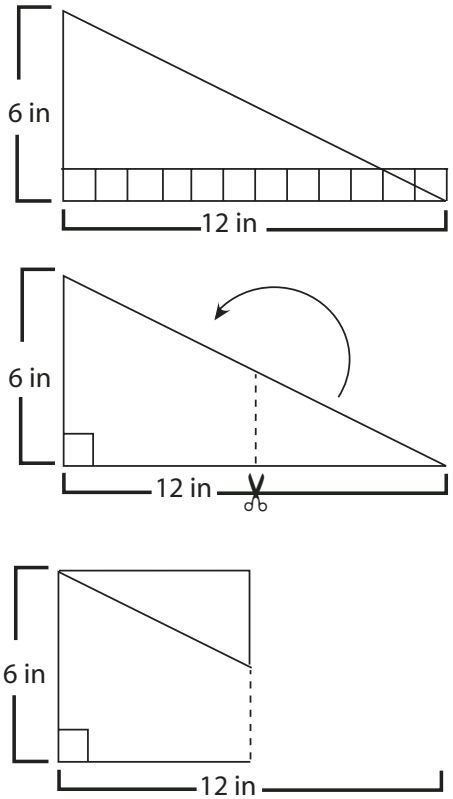
$$P = 4 + 7 + 9$$
$$= 20 \text{ in}$$

$$\mathbf{P = a + b + c}$$

Measuring Polygons (cont.)

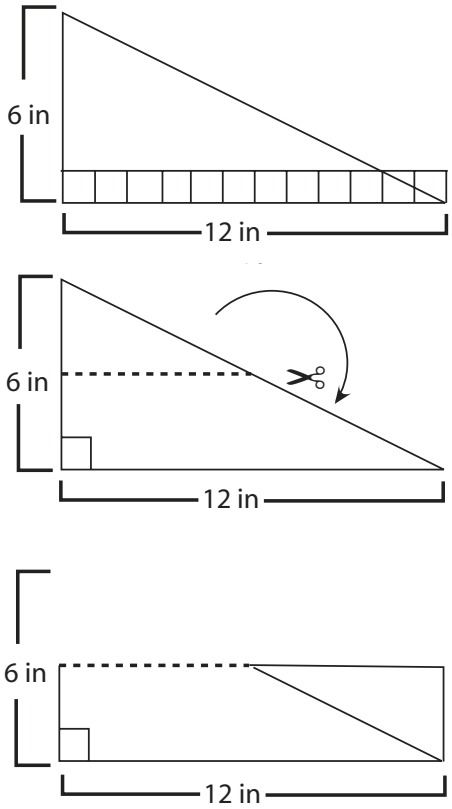
Right Triangle

Area (A)
method 1



$$A = b \cdot h$$
$$= \frac{1}{2} b \cdot h$$
$$= 6 \cdot 6$$
$$= 36 \text{ sq in}$$

Area (A)
method 2

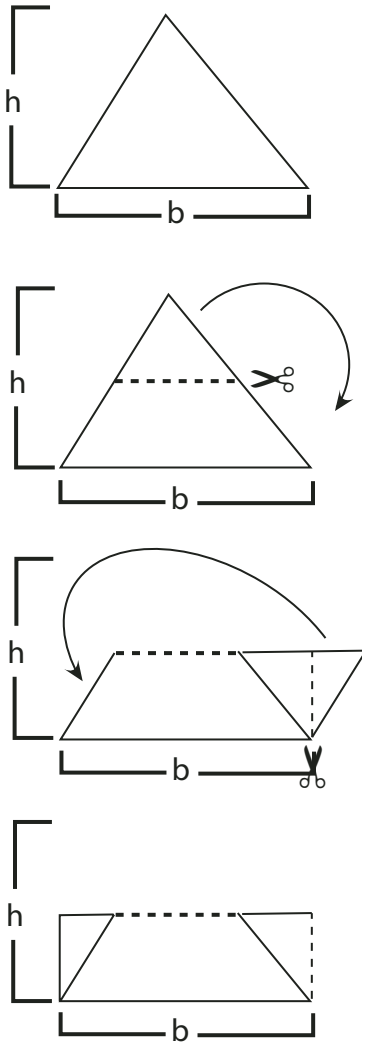


$$A = b \cdot h$$
$$= b \cdot \frac{1}{2} h$$
$$= 12 \cdot 3$$
$$= 36 \text{ sq in}$$

Measuring Polygons (cont.)

Acute Triangle

Area (A)



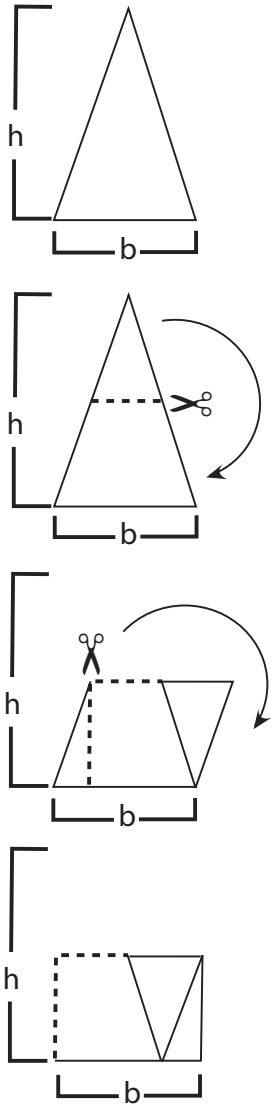
$$A = b \cdot h$$

$$\mathbf{A = b \cdot \frac{1}{2} \cdot h}$$

Measuring Polygons (cont.)

Isosceles Triangle

Area (A)



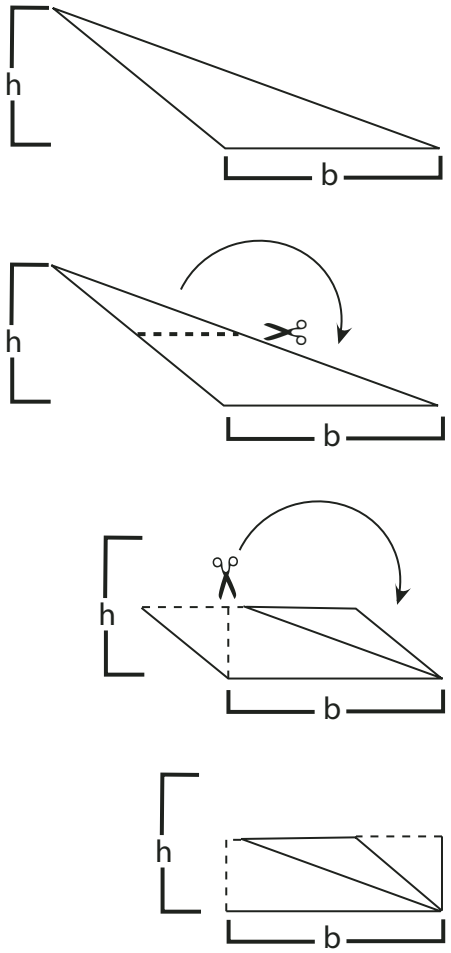
$$A = b \cdot h$$

$$\mathbf{A = b \cdot \frac{1}{2} h}$$

Measuring Polygons (cont.)

Obtuse Triangle

Area (A)



$$A = b \cdot h$$

$$\mathbf{A = b \cdot \frac{1}{2} h}$$

Unit I — The Structure of Geometry

Part C — Measurement

Lesson 3 — *Triangles*

Objective: To understand, and demonstrate, the concepts of area and perimeter, as they relate to triangles.

Important Terms:

Triangle – A polygon made with three line segments.

Right Triangle – A triangle in which one of the angles is a right angle (90^o).

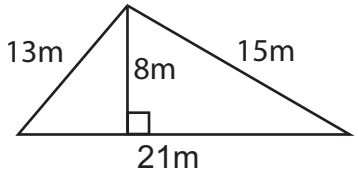
Perimeter – Intuitively, the measure of the distance around a simple closed plane curve. Formally, the perimeter of a polygon is simply the sum of the measures of its sides.

Perimeter of a Triangle – Formally, the perimeter of a triangle can be found by adding the measures of all three sides, as long as all of the sides are measured in the same units. There really is no standard formula for this relationship except to express it symbolically as $P = a + b + c$ where a, b, and c are the measures of the three sides.

Area – Intuitively, the number of non-overlapping unit squares, and parts of unit squares, which can be fit into the interior of a simple closed plane curve.

Area of a Triangle – Formally, the area A of a triangle, can be found by multiplying the measure of the base b by one-half of the measure of the height h on that base, as long as the base and height are measured in the same units. This is represented by the formula $A = b \cdot \frac{1}{2} \cdot h$ or, more commonly, $A = \frac{1}{2} \cdot b \cdot h$.

Example : Find the perimeter and the area of the triangle illustrated below, using the indicated measures.



Solution: First, the perimeter of this triangle can be found intuitively, by adding the measures of all of its sides.

$$P = 13 + 15 + 21 = 49 \text{ meters}$$

Formally, the solution is the same since the formula tells us we must add the measures of all three sides.

$$P = a + b + c$$

$$= 13 + 15 + 21$$

$$= 49 \text{ meters}$$

Second, it is difficult, intuitively, to find the area of this triangle without cutting it up in pieces and rearranging, so we will find it formally, by using the formula for the area of a triangle.

$$A = \tfrac{1}{2} \cdot b \cdot h$$

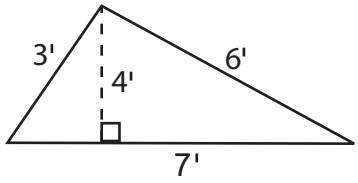
$$= \tfrac{1}{2} \cdot 21 \cdot 8$$

$$= 84 \text{ square meters}$$

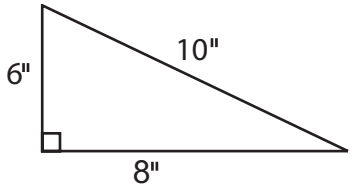
Lesson 3 — Exercises:

Find the area and perimeter of each of the triangles in exercises 1 through 8.

1.

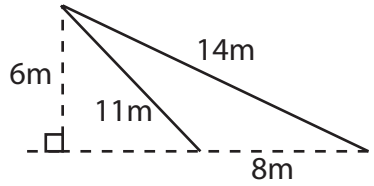


2.

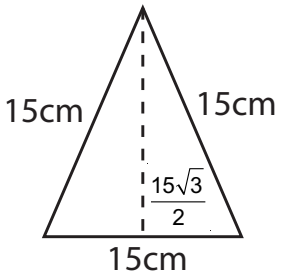


Lesson 3 — Exercises: (cont'd)

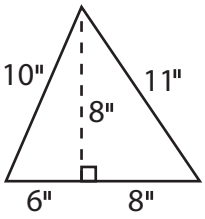
3.



4.



5.



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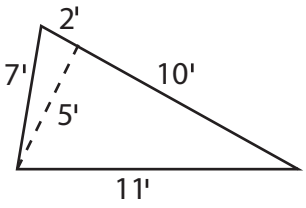

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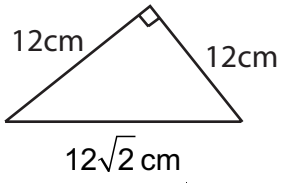
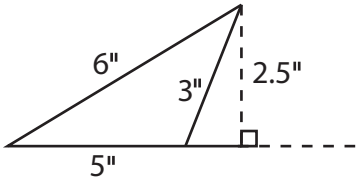
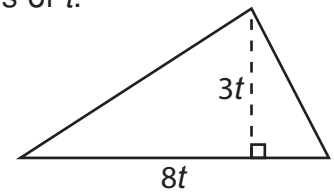


8.



Find the area of each of the triangles in exercises 9 through 11. Express your answer in terms of *t*.

9.



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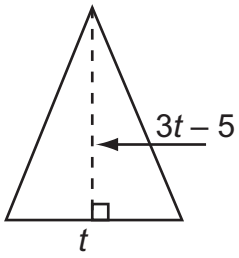
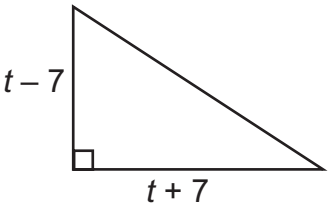
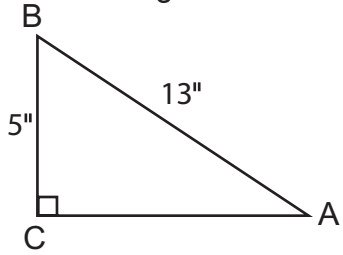


11.



12. Find the area of the given right triangle if the measure of the line segment AB is 13 inches and the measure of line segment BC is 5 inches.



13. *Perimeter = Sum of the lengths of the sides*

$= \frac{1}{3}k + \frac{1}{5}k + \frac{1}{3}k + \frac{1}{5}k$

$= \frac{1}{3}k + \frac{1}{3}k + \frac{1}{5}k + \frac{1}{5}k$

$= (\frac{1}{3} + \frac{1}{3}) \cdot k + (\frac{1}{5} + \frac{1}{5}) \cdot k$

$= (\frac{1+1}{3}) \cdot k + (\frac{1+1}{5}) \cdot k$

$= \frac{2}{3} \cdot k + \frac{2}{5} \cdot k$

$= (\frac{2}{3} + \frac{2}{5}) \cdot k$

$= (\frac{2 \cdot 5}{3 \cdot 5} + \frac{2 \cdot 3}{5 \cdot 3}) \cdot k$

$= (\frac{10}{15} + \frac{6}{15}) \cdot k$

$= \frac{10+6}{15} \cdot k$

$= \frac{16}{15}k$

A = b • h

$= (\frac{1}{3}k) \cdot (\frac{1}{5}k)$

$= \frac{1}{3} \cdot k \cdot \frac{1}{5} \cdot k$

$= \frac{1}{3} \cdot \frac{1}{5} \cdot k \cdot k$

$= \frac{1 \cdot 1}{3 \cdot 5} \cdot k \cdot k$

$= \frac{1}{15}k^2$ *square units*

14. *Perimeter = Sum of the lengths of the sides*

$= 5k + 5k + 5k + 5k$

$= (5 + 5 + 5 + 5) \cdot k$

$= 20k$ *units*

$A = b \cdot h$

$= 5k \cdot (k + 4)$

$= 5k \cdot k + 5k \cdot 4$

$= 5k^2 + 5 \cdot 4 \cdot k$

$= 5k^2 + 20k$

$= (5k^2 + 20k)$ *units*^{2}

Unit I — The Structure of Geometry

Part C — Measurement

p. 53 – Lesson 3 — Triangles

1.

$Area = \frac{1}{2} \cdot b \cdot h$

$= \frac{1}{2} \cdot 7 \text{ ft} \cdot 4 \text{ ft}$

$= \frac{1 \cdot 7 \cdot \cancel{4} \cdot 2}{\cancel{2} \cdot 1}$

$= 14$ *sq. ft or* 14 ft^2

Perimeter = Sum of the lengths of the sides

$= 3 \text{ ft} + 7 \text{ ft} + 6 \text{ ft}$

$= 10 \text{ ft} + 6 \text{ ft}$

$= 16 \text{ ft}$

2.

$Area = \frac{1}{2} \cdot b \cdot h$

$= \frac{1}{2} \cdot 8 \text{ in.} \cdot 6 \text{ in.}$

$= \frac{1 \cdot \cancel{2} \cdot 4 \cdot 6}{\cancel{2} \cdot 1}$

$= 24 \text{ sq. in. or } 24 \text{ in}^2$

Perimeter = Sum of the lengths of the sides

$= 6 \text{ in.} + 8 \text{ in.} + 10 \text{ in.}$

$= 14 \text{ in.} + 10 \text{ in.}$

$= 24 \text{ in.}$

3.

$Area = \frac{1}{2} \cdot b \cdot h$

$= \frac{1}{2} \cdot 8 \text{ m} \cdot 6 \text{ m}$

$= \frac{1 \cdot \cancel{2} \cdot 4 \cdot 6}{\cancel{2} \cdot 1}$

$= 24 \text{ sq. m or } 24 \text{ m}^2$

Perimeter = Sum of the lengths of the sides

$= 8 \text{ m} + 14 \text{ m} + 11 \text{ m}$

$= 22 \text{ m} + 11 \text{ m}$

$= 33$ *meters*

4.

$Area = \frac{1}{2} \cdot b \cdot h$

$= \frac{1}{2} \cdot 15 \text{ cm} \cdot \frac{15\sqrt{3}}{2} \text{ cm}$

$= \frac{1 \cdot 15 \cdot 15 \cdot \sqrt{3}}{2 \cdot 1 \cdot 2}$

$= \frac{225\sqrt{3}}{4} \text{ cm}^2$

Perimeter = Sum of the lengths of the sides

$= 15 \text{ cm} + 15 \text{ cm} + 15 \text{ cm}$

$= 30 \text{ cm} + 15 \text{ cm}$

$= 45 \text{ cm}$

5.

$Area = \frac{1}{2} \cdot b \cdot h$

$= \frac{1}{2} \cdot (6 \text{ in.} + 8 \text{ in.}) \cdot 8 \text{ in.}$

$= \frac{1 \cdot 14 \cdot 8}{2 \cdot 1 \cdot 1}$

$= \frac{1 \cdot \cancel{2} \cdot 7 \cdot 8}{\cancel{2} \cdot 1 \cdot 1}$

$= 56 \text{ sq. in. or } 56 \text{ in}^2$

Perimeter = Sum of the lengths of the sides

$= 10 \text{ in.} + 6 \text{ in.} + 8 \text{ in.} + 11 \text{ in.}$

$= 16 \text{ in.} + 8 \text{ in.} + 11 \text{ in.}$

$= 24 \text{ in.} + 11 \text{ in.}$

$= 35$ *inches*

6.

$Area = \frac{1}{2} \cdot b \cdot h$

$= \frac{1}{2} \cdot (10 \text{ ft} + 2 \text{ ft}) \cdot 5 \text{ ft}$

$= \frac{1 \cdot 12 \cdot 5}{2 \cdot 1 \cdot 1}$

$= \frac{1 \cdot \cancel{2} \cdot 6 \cdot 5}{\cancel{2} \cdot 1 \cdot 1}$

$= 30 \text{ sq. ft or } 30 \text{ ft}^2$

Perimeter = Sum of the lengths of the sides

$= 11 \text{ ft} + 10 \text{ ft} + 2 \text{ ft} + 7 \text{ ft}$

$= 21 \text{ ft} + 9 \text{ ft}$

$= 30$ *feet*

7.

$$\text{Area} = \frac{1}{2} \bullet b \bullet h$$
$$= \frac{1}{2} \bullet 12\text{ cm} \bullet 12\text{ cm}$$
$$= \frac{1 \bullet \cancel{2} \bullet 6 \bullet 12}{\cancel{2} \bullet 1 \bullet 1}$$
$$= 72\text{ sq. cm or } 72\text{ cm}^2$$

$$\text{Perimeter} = \text{Sum of the lengths of the sides}$$
$$= 12\text{ cm} + 12\text{ cm} + 12\sqrt{2}\text{ cm}$$
$$= (24\text{ cm} + 12\sqrt{2})\text{ cm}$$

8.

$$\text{Area} = \frac{1}{2} \bullet b \bullet h$$
$$= \frac{1}{2} \bullet 5\text{ in.} \bullet 2.5\text{ in.}$$
$$= \frac{1}{2} \bullet 5\text{ in.} \bullet 2\frac{1}{2}\text{ in.}$$
$$= \frac{1}{2} \bullet 5\text{ in.} \bullet \frac{5}{2}\text{ in.}$$
$$= \frac{1 \bullet 5 \bullet 5}{2 \bullet 1 \bullet 2}$$
$$= \frac{25}{4}\text{ sq. in. or } 6\frac{1}{4}\text{ in}^2$$

$$\text{Perimeter} = \text{Sum of the lengths of the sides}$$
$$= 5\text{ in.} + 3\text{ in.} + 6\text{ in.}$$
$$= 8\text{ in.} + 6\text{ in.}$$
$$= 14\text{ in.}$$

9.

$$\text{Area} = \frac{1}{2} \bullet b \bullet h$$
$$= \frac{1}{2} \bullet (8t) \bullet (3t)$$
$$= \frac{1 \bullet \cancel{2} \bullet 4 \bullet t \bullet 3 \bullet t}{\cancel{2} \bullet 1 \bullet 1}$$
$$= 4 \bullet t \bullet 3 \bullet t$$
$$= 4 \bullet 3 \bullet t \bullet t$$
$$= 12t^2\text{ sq. units}$$

10.

$$\text{Area} = \frac{1}{2} \bullet b \bullet h$$
$$= \frac{1}{2} \bullet (t) \bullet (3t - 5)$$
$$= \frac{1 \bullet (t) \bullet (3t - 5)}{2 \bullet 1 \bullet 1}$$
$$= \frac{(t)(3t) + (t)(-5)}{2 \bullet 1}$$
$$= \left(\frac{3t^2 - 5t}{2}\right)\text{sq. units}$$

11.

$$\text{Area} = \frac{1}{2} \bullet b \bullet h$$
$$= \frac{1}{2} \bullet (t + 7) \bullet (t - 7)$$
$$= \frac{1}{2} \bullet \frac{(t + 7)}{1} \bullet \frac{(t - 7)}{1}$$
$$= \frac{1 \bullet (t + 7)\ (t - 7)}{2 \bullet 1 \bullet 1}$$
$$= \frac{(t + 7)\ (t - 7)}{2}$$
$$= \frac{(t + 7)(t) + (t - 7)(-7)}{2}$$
$$= \frac{t \bullet t + 7 \bullet t + (t)(-7) + (7)(-7)}{2}$$
$$= \frac{t^2 + 7t + -7t + -49}{2}$$
$$= \frac{t^2 + (7 + -7)t - 49}{2}$$
$$= \frac{t^2 + 0 \bullet t - 49}{2}$$
$$= \frac{t^2 + 0 - 49}{2}$$
$$= \left(\frac{t^2 - 49}{2}\right)\text{sq. units}$$

12. *Pythagorean Triangle for right triangles*

$$a^2 + b^2 = c^2$$
$$5^2 + b^2 = 13^2$$
$$25 + b^2 = 169$$
$$25 + b^2 + -25 = 169 + -25$$
$$0 + b^2 = 144$$
$$b^2 = 144$$
$$b^2 - 144 = 144 - 144$$
$$b^2 - 144 = 0$$
$$(b - 12)(b + 12) = 0$$

$b - 12 = 0$ or $b + 12 = 0$

$b - 12 + 12 = 0 + 12$ $\qquad$ $b + 12 - 12 = 0 - 12$

$b - 0 = 12$ $\qquad$ $b = -12$

$b = 12$ inches $\qquad$ (b cannot be negative)

$$\text{Area} = \frac{1}{2} \bullet b \bullet h$$
$$= \frac{1}{2} \bullet 5\text{ in.} \bullet 12\text{ in.}$$
$$= \frac{1 \bullet 5 \bullet 2 \bullet 6}{2 \bullet 1 \bullet 1}$$
$$= 30\text{ sq. in.}$$

Quiz Form A

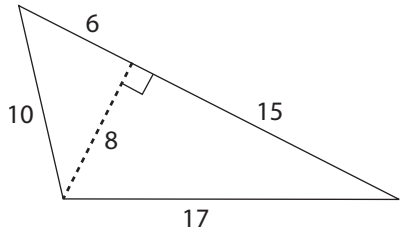
Name _____

Class _____ Date _____ Score _____

Unit I - The Structure of Geometry
Part C - Measurement
Lesson 3 - Triangles

Find the area and perimeter of the given triangles in exercises 1 through 3. (Note: You may first have to use the Pythagorean Theorem ($a^2 + b^2 = c^2$) to find some missing parts.

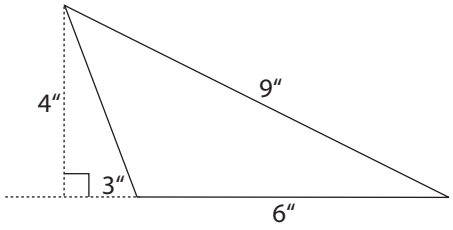
1.



Area:_____

Perimeter:_____

2.

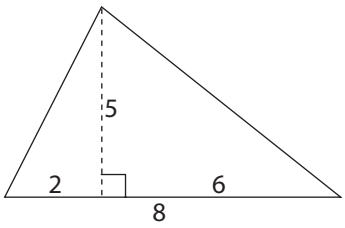


Area:_____

Perimeter:_____

Name _____

3.



Area:_____

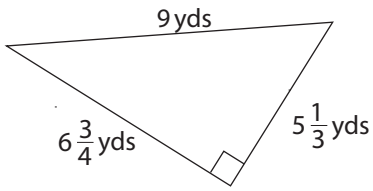
Perimeter:_____

4. Find the area of a triangle with base $(2x + 3)$ units and height $(4x - 2)$ units.

Area:_____

Name _____

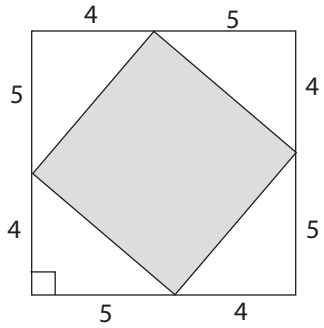
5. Find the area and perimeter of the given triangle.



Area:_____

Perimeter:_____

6. Find the area and perimeter of the shaded square in the given figure.



Area:_____

Perimeter:_____

Quiz Form B

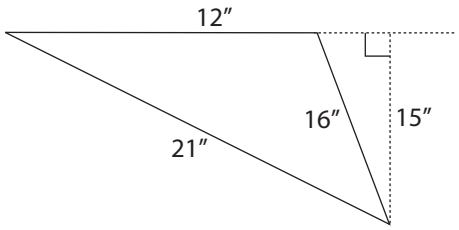
Name _____

Class _____ Date _____ Score _____

Unit I - The Structure of Geometry
Part C - Measurement
Lesson 3 - Triangles

Find the area and perimeter of the given triangles in exercises 1 through 3. Note: You may first have to use the Pythagorean Theorem ($a^2 + b^2 = c^2$) to find some missing parts.

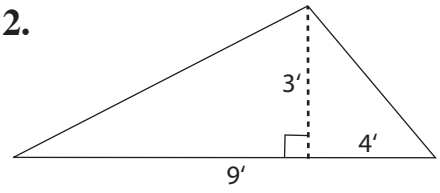
1.



Area:_____

Perimeter:_____

2.

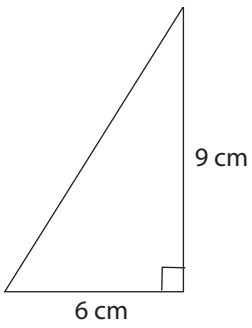


Area:_____

Perimeter:_____

Name _____

3.



Area:_____

Perimeter:_____

4. Find the area of a triangle with base $(2x - 4)$ units and height $(x - 2)$ units

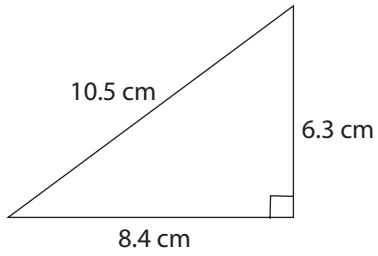
Area:_____

Name _____

5. Find the area and perimeter of the given figure.

Area:_____

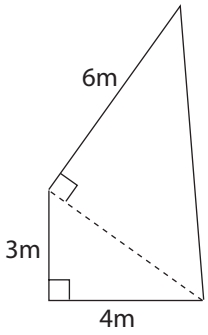
Perimeter:_____



6. Find the area and perimeter of the given figure.

Area:_____

Perimeter:_____



Quiz Form A

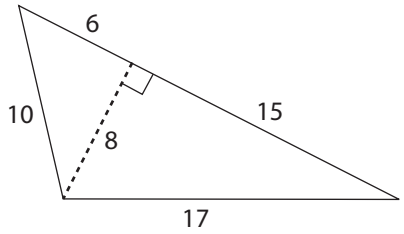
Name _____

Class _____ Date _____ Score _____

Unit I - The Structure of Geometry
Part C - Measurement
Lesson 3 - Triangles

Find the area and perimeter of the given triangles in exercises 1 through 3. [Note: You may first have to use the Pythagorean Theorem ($a^2 + b^2 = c^2$) to find some missing parts.]

1.



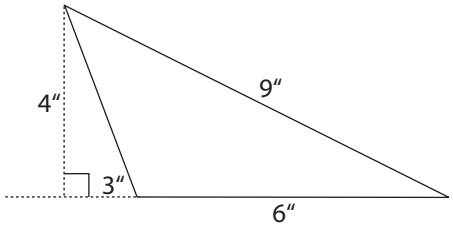
Area: *84 sq. units*

Perimeter: *48 units*

$$Area = \frac{1}{2} \cdot base \cdot height$$
$$= \frac{1}{2} \cdot (15+6) \cdot 8$$
$$= \frac{1 \cdot 21 \cdot 8}{2}$$
$$= \frac{1 \cdot 21 \cdot 2 \cdot 4}{2}$$
$$= 21 \cdot 4$$
$$= 84 \text{ square units}$$

$$Perimeter = Sum\ of\ lengths\ of\ the\ sides$$
$$= 10 + 17 + (15+6)$$
$$= 48 \text{ units}$$

2.



Area: *12 sq. inches*

Perimeter: *20 inches*

$$Area = \frac{1}{2} \cdot base \cdot height$$
$$= \frac{1}{2} \cdot 6 \cdot 4$$
$$= \frac{1 \cdot 6 \cdot 4}{2}$$
$$= \frac{1 \cdot 2 \cdot 3 \cdot 4}{2}$$
$$= 12 \text{ square inches}$$

Perimeter = Sum of Lengths of the Sides

Perimeter = 6 + 9 + 5

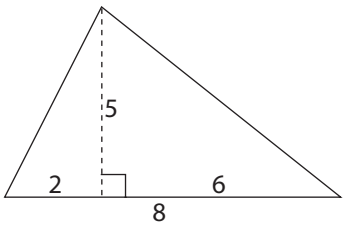
Perimeter = 20 inches

Pythagorean Theorem

$$a^2 + b^2 = c^2$$
$$3^2 + 4^2 = c^2$$
$$9 + 16 = c^2$$
$$25 = c^2$$
$$5 = c$$

Name _____

3.



Area: *20 sq. inches*

Perimeter: $\left(8+\sqrt{29}+\sqrt{61}\right)$ *units*

$$Area = \frac{1}{2}\cdot base \cdot height$$
$$= \frac{1}{2}\cdot 8 \cdot 5$$
$$= \frac{8\cdot 5}{2}$$
$$= \frac{2\cdot 4\cdot 5}{2}$$
$$= 4\cdot 5$$
$$= 20 \text{ square units}$$

Pythagorean Theorem

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

$2^2+5^2=x^2$ $\quad$ $6^2+5^2=y^2$

$4+25=x^2$ $\quad$ $36+25=y^2$

$29=x^2$ $\quad$ $61=y^2$

$\sqrt{29}=x$ $\quad$ $\sqrt{61}=y$

$$Perimeter = Sum\ of\ Lengths\ of\ the\ Sides$$
$$Perimeter = \left(8+\sqrt{29}+\sqrt{61}\right) units$$

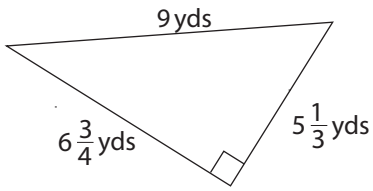
4. Find the area of a triangle with base $(2x + 3)$ units and height $(4x - 2)$ units.

Area: $\left(4x^2+4x-3\right)$ *square units*

$$Area = \frac{1}{2}\cdot base \cdot height$$
$$= \frac{1}{2}\cdot(2x+3)\cdot(4x-2)$$
$$= \frac{1\cdot(2x+3)(4x-2)}{2}$$
$$= \frac{2x\cdot 4x+3\cdot 4x+2x\cdot(-2)+3\cdot(-2)}{2}$$
$$= \frac{8x^2+12x+{}^-4x+{}^-6}{2}$$
$$= \frac{8x^2+8x-6}{2}$$
$$= \frac{2\left(4x^2+4x-3\right)}{2}$$
$$= \left(4x^2+4x-3\right) \text{ square units}$$

Name _____

5. Find the area and perimeter of the given triangle.



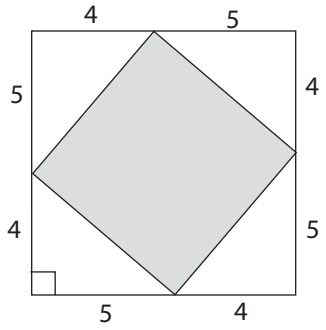
Area: *18 sq. yards*

Perimeter: $21\frac{1}{2}$ *yards*

$$Area = \frac{1}{2} \cdot base \cdot height$$
$$= \frac{1}{2} \cdot 6\frac{3}{4} \cdot 5\frac{1}{3}$$
$$= \frac{1}{2} \cdot \frac{27}{4} \cdot \frac{16}{3}$$
$$= \frac{27 \cdot 16}{2 \cdot 4 \cdot 3}$$
$$= \frac{3 \cdot 9 \cdot 4 \cdot 2 \cdot 2}{2 \cdot 4 \cdot 3}$$
$$= 9 \cdot 2$$
$$= 18 \text{ square yards}$$

$$Perimeter = Sum\ of\ lengths\ of\ the\ sides$$
$$= 6\frac{3}{4} + 5\frac{1}{3} + 9$$
$$= \frac{27}{4} + \frac{16}{3} + 9$$
$$= \frac{27 \cdot 3}{4 \cdot 3} + \frac{16 \cdot 4}{3 \cdot 4} + \frac{9 \cdot 12}{1 \cdot 12}$$
$$= \frac{81}{12} + \frac{64}{12} + \frac{108}{12}$$
$$= \frac{81 + 64 + 108}{12}$$
$$= \frac{253}{12} \text{ or } 21\frac{1}{12} \text{ yards}$$

6. Find the area and perimeter of the shaded square in the given figure.



Area: *41 sq. units*

Perimeter: $4\sqrt{41}$ *units*

Area of Larger Square:

$$Area = (5+4) \cdot (5+4)$$
$$= 9 \cdot 9$$
$$= 81 \text{ square units}$$

Pythagorean Theorem helps us find c.

$$a^2 + b^2 = c^2$$
$$4^2 + 5^2 = c^2$$
$$16 + 25 = c^2$$
$$41 = c^2$$
$$\sqrt{41} = c$$

c) Area of Shaded Square

$$Area = \sqrt{41} \cdot \sqrt{41}$$
$$= \sqrt{41 \cdot 41}$$
$$= \sqrt{1681}$$
$$= 41 \text{ square units}$$

d) Perimeter is the sum of the lengths of the sides.

$$Perimeter = \sqrt{41} + \sqrt{41} + \sqrt{41} + \sqrt{41}$$
$$= (1+1+1+1)\sqrt{41}$$
$$= 4\sqrt{41} \text{ units}$$

Quiz Form B

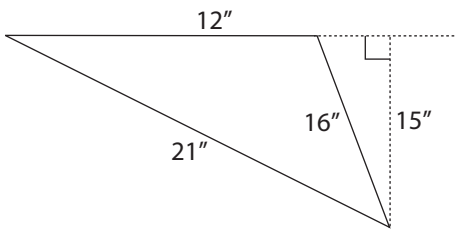
Name _____

Class Date Score _____

Unit I - The Structure of Geometry
Part C - Measurement
Lesson 3 - Triangles

Find the area and perimeter of the given triangles in exercises 1 through 3. Note: You may first have to use the Pythagorean Theorem ($a^2 + b^2 = c^2$) to find some missing parts.

1.



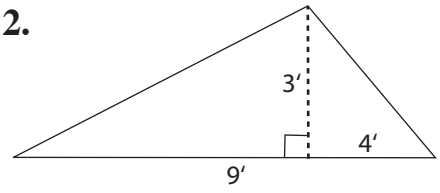
Area: *90 sq. inches*

Perimeter: *49 inches*

$$Area = \frac{1}{2} \cdot base \cdot height$$
$$= \frac{1}{2} \cdot 12 \cdot 15$$
$$= \frac{1 \cdot 12 \cdot 15}{2}$$
$$= \frac{1 \cdot 2 \cdot 6 \cdot 15}{2}$$
$$= 6 \cdot 15$$
$$= 90 \text{ square inches}$$

$$Perimeter = Sum\ of\ Lengths\ of\ the\ Sides$$
$$= 21 + 16 + 12$$
$$= 21 + 28$$
$$= 49 \text{ inches}$$

2.



Area: $13\frac{1}{2}$ *sq. feet*

Perimeter: $\left(14 + \sqrt{34}\right)$ *feet*

$$Area = \frac{1}{2} \cdot base \cdot height$$
$$= \frac{1}{2} \cdot 9 \cdot 3$$
$$= \frac{1 \cdot 9 \cdot 3}{2 \cdot 1 \cdot 1}$$
$$= \frac{27}{2} \text{ or } 13\frac{1}{2} \text{ square feet}$$

Pythagorean Theorem

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

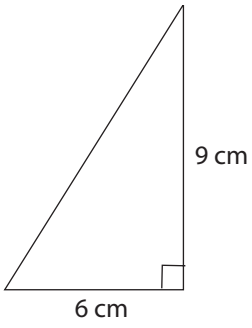
Two Missing Pieces:

$$3^2 + 4^2 = x^2 \qquad 3^2 + 5^2 = y^2$$
$$9 + 16 = x^2 \qquad 9 + 25 = y^2$$
$$25 = x^2 \qquad 34 = y^2$$
$$\sqrt{25} = x \qquad \sqrt{34} = y$$
$$5 = x$$

$$Perimeter = Sum\ of\ Lengths\ of\ the\ Sides$$
$$= \left(9 + 5 + \sqrt{34}\right) \text{ feet}$$
$$= \left(14 + \sqrt{34}\right) \text{ feet}$$

Name _____

3.



Area: *27 sq. sm*

Perimeter: $(15+3\sqrt{13})cm$

$$Area = \frac{1}{2}\cdot base \cdot height$$
$$= \frac{1}{2}\cdot 6 \cdot 9$$
$$= \frac{1\cdot 6\cdot 9}{2}$$
$$= \frac{1\cdot 2\cdot 3\cdot 9}{2}$$
$$= 27 \text{ square cm}$$

Pythagorean Theorem

$$a^2+b^2=c^2$$
$$6^2+9^2=c^2$$
$$36+81=c^2$$
$$117=c^2$$
$$\sqrt{117}=c$$
$$\sqrt{3^2\cdot 13}=c$$
$$3\sqrt{13}=c$$

$$Perimeter = Sum\ of\ Lengths\ of\ the\ Sides$$
$$= 6+9+3\sqrt{13}$$
$$= (15+3\sqrt{13})cm$$

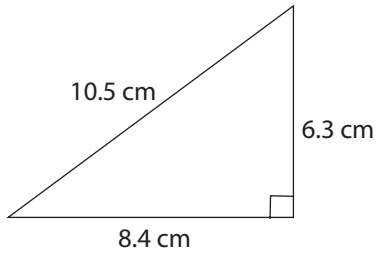
4. Find the area of a triangle with base $(2x - 4)$ units and height $(x - 2)$ units

Area: $(4x^2+4x-3)$ *square units*

$$Area = \frac{1}{2}\cdot base \cdot height$$
$$= (2x+3)(4x-2)$$
$$= \frac{8x^2+8x-6}{2}$$
$$= \frac{8x^2+8x-6}{2}$$
$$= \frac{2(4x^2+4x-3)}{2}$$
$$= (4x^2+4x-3) \text{ square units}$$

Name _____

5. Find the area and perimeter of the given figure.



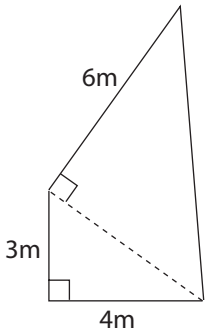
Area: *26.46 cm²*

Perimeter: *25.2 cm*

$$Area = \frac{1}{2} \cdot base \cdot height$$
$$= \frac{1}{2} \cdot (8.4) \cdot (6.3)$$
$$= \frac{(8.4)(6.3)}{2}$$
$$= \frac{2 \cdot (4.2) \cdot (6.3)}{2}$$
$$= 26.46\ cm^2$$

$$Perimeter = Sum\ of\ Lengths\ of\ the\ Sides$$
$$= 8.4 + 6.3 + 10.5$$
$$= 25.2\ cm$$

6. Find the area and perimeter of the given figure.



Area: *21 sq. meters*

Perimeter: $(13 + \sqrt{61})$ *meters*

Pythagorean Theorem

a) find c.

$$a^2 + b^2 = c^2$$
$$3^2 + 4^2 = c^2$$
$$9 + 16 = c^2$$
$$\sqrt{25} = c$$
$$5 = c$$

b) Find x:

$$a^2 + b^2 = x^2$$
$$6^2 + 5^2 = x^2$$
$$36 + 25 = x^2$$
$$61 = x^2$$
$$\sqrt{61} = x$$

c) Perimeter is:

$$Perimeter = 6 + 3 + 4 + \sqrt{61}$$
$$Perimeter = (13 + \sqrt{61})\ meters$$

d) Area is half the base times the height

$$Area = \frac{1}{2} \cdot base \cdot height + \frac{1}{2} \cdot base$$
$$Area = \frac{1}{2} \cdot 4 \cdot 3 + \frac{1}{2} \cdot 5 \cdot 6$$
$$Area = \frac{1 \cdot 4 \cdot 3}{2 \cdot 1 \cdot 1} + \frac{1 \cdot 5 \cdot 2 \cdot 3}{2 \cdot 1 \cdot 1}$$
$$Area = 6 + 15$$
$$Area = 21\ square\ meters$$