Weekly Focus: geometry intro
Weekly Skill: vocabulary, and measure perimeter, area

LESSON 41: Triangles and Quadrilaterals

Lesson Summary: For the warm up, students will solve a problem about the U.S. debt in relation to its population. In Activity 1, students will learn vocabulary about triangles and quadrilaterals. In Activity 2, students will do computation problems. In Activity 3, they will solve word problems. There is an optional card game activity as well as a True/False exit ticket. Estimated time for the lesson is 2 hours.

Materials Needed for Lesson 41:

- Video (length 4:38) on classifying quadrilaterals
- Video (length 4:44) on classifying triangles. The videos are required for teachers and optional for students.
- Vocabulary Worksheet
- Worksheet 41.1 with answers (attached)
- Geometry notes to be used for this lesson *and the next 4 lessons also.* (the notes come from http://www.asu.edu/courses/mat142ej/geometry/Geometry.pdf)
- *Mathematical Reasoning Test Preparation for the 2014 GED Test* Student Book (pages 94 – 95)
- *Mathematical Reasoning Test Preparation for the 2014 GED Test* Workbook (pages 126 – 129)
- Decks of cards for the extra activity (optional)
- Exit Ticket

Objectives: Students will be able to:

- Solve the U.S. debt word problem
- Learn geometry vocabulary about triangles and quadrilaterals
- Practice measurement of perimeter and area
- Solve word problems related to triangles and quadrilaterals

ACES Skills Addressed: N, CT, ALS
CCRS Mathematical Practices Addressed: Model with Mathematics, Mathematical Fluency
Levels of Knowing Math Addressed: Intuitive, Abstract, Pictorial, and Application

Notes:
You can add more examples if you feel students need them before they work. Any ideas that concretely relate to their lives make good examples.

For more practice as a class, feel free to choose some of the easier problems from the worksheets to do together. The "easier" problems are not necessarily at the beginning of each worksheet. Also, you may decide to have students complete only part of the worksheets in class and assign the rest as homework or extra practice.

The GED Math test is 115 minutes long and includes approximately 46 questions. The questions have a focus on quantitative problem solving (45%) and algebraic problem solving (55%).

Students must be able to understand math concepts and apply them to new situations, use logical reasoning to explain their answers, evaluate and further the reasoning of others, represent real world problems algebraically and visually, and manipulate and solve algebraic expressions.

This computer-based test includes questions that may be multiple-choice, fill-in-the-blank, choose from a drop-down menu, or drag-and-drop the response from one place to another.

The purpose of the GED test is to provide students with the skills necessary to either further their education or be ready for the demands of today's careers.

Lesson 41 Warm-up: Solve the U.S. debt problem	**Time: 5 Minutes**

Write on the board: The federal U.S. debt is $17 trillion dollars.

Basic Question:

- If the population of the U.S. is 314 million, estimate how much debt there is per person.
- Notes:
    - Have students write on the board how much 17 trillion is (17,000,000,000,000) and how much 314 million is (314,000,000).
    - Have students Google the population of the U.S. instead of telling them what it is.
    - Students may solve the problem with proportions or just division. Have students volunteer to write on the board how they solved the problem.
    - The answer is about $54,000 per U.S. resident.

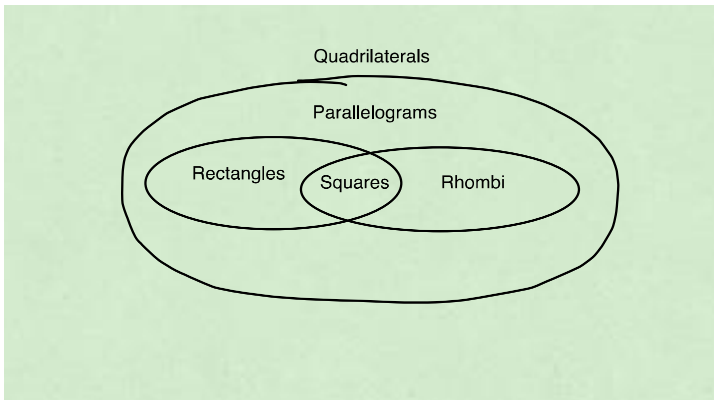
Extension Question:

- Write an equation to solve the problem.
    - The answer is a variation of 17,000,000,000,000 = 314,000,000 X

Lesson 41 Activity 1: Geometry Introduction: Vocabulary	**Time: 20 Minutes**

1. Start the core lesson with a discussion about what geometry is and when it is used. Solicit answers from the students.
    - Answers will vary but may include such responses as: *Geometry is a part of math that is used to do measurements, shapes, points, lines and their relationships. Geometry is used in construction, photography, cooking, home improvement, engineering, interior design, etc.*
2. Hand out the **Vocabulary Worksheet** to students.
3. Give students a few minutes to fill in the words they know and then finish together.
    - Answers: *1. Polygon 2. Triangle 3. Quadrilateral 4. Right 5. Acute 6. Obtuse 7. Congruent 8. Isosceles 9. Scalene 10. Equilateral 11. Rectangle 12. Square 13. Perimeter 14. Area*
4. Explain that triangles can be described by their angles or by their sides. The measurement of their inside angles adds up to 180 degrees (half of those of a quadrilateral).

5. Say that the measurement of the inside angles of a quadrilateral is 360 degrees.
6. Explain the relationship among quadrilaterals by making a drawing on the board similar to the one below. It shows that:
    a. Rectangles, rhombi, and squares are all parallelograms.
    b. Squares can be classified as rectangles and as rhombi. (A rhombus has opposite sides parallel.)
    c. All parallelograms are quadrilaterals.



Lesson 41 Activity 2: Perimeter and Area Computation	Time: 15 Minutes

1. Give students the attached **Geometry Notes.** Students will use these notes as reference for this lesson *and the next 4 lessons*.
2. Review how to measure perimeter and area. Explain that the terms length and width are sometimes used interchangeably with the terms base and height.
3. Explain why the area formula for a triangle is ½ times base times height. Take a square sheet of paper, ask the students how to measure its area (b x h), then fold it in half to show a triangle. The area of a triangle is half that of a quadrilateral.
4. Do **Worksheet 41.1.** Do #1 together and let the students work independently on the rest.
5. Check answers by having volunteers (those who finish early) write their answers on the board.

Lesson 41 Activity 3: Solve Problems	Time: 60 Minutes

1. Solve the problems in the **student book pages 94-95** together (15 minutes).
2. Have students work independently in the **workbook pages 126-129** (45 minutes).
3. Have volunteers write their solutions on the board for some of the more challenging problems.

Lesson 41 Exit Ticket: True or False	Time: 5 Minutes

Print out this half-sheet activity, and have students complete it individually. Either check each student's paper for the correct answers as he/she completes it, or go over the answers as a group before students leave.

Answers: 1. F (correct is perimeter) 2. T 3. T 4. F (correct is 2 equal sides) 5. F (correct is 180 degrees)

Lesson 41 Extra Activity: Area Card Game	Time: 10 Minutes

1. This card game can be played to reinforce calculation of area or played if there is extra time.
2. See the attached instructions sheet.

Activity 1 Vocabulary Worksheet

Triangles and Quadrilaterals Vocabulary		
Rectangle Square Acute Area Scalene	Triangle Obtuse Isosceles Equilateral Polygon	Quadrilateral Right Congruent Perimeter

Choose the best word above to fill in the blanks of the definitions below.

1. A ____________________________ is a flat closed figure formed by 3 or more lines.
2. A ____________________________ is a polygon with 3 sides.
3. A ____________________________ is a polygon with 4 sides and 4 angles.
4. A ____________________________ triangle is a triangle whose largest angle is 90 degrees.
5. An ___________________________ triangle is a triangle whose largest angle is less than 90 degrees.
6. An __________________________ triangle is a triangle whose largest angle is more than 90 degrees.
7. ____________________________ means all the sides are equal.
8. A ____________________________ triangle is a triangle with 2 congruent sides.
9. A ____________________________ triangle is a triangle with no congruent sides.
10. An____________________________ triangle has 3 congruent sides.
11. A ____________________________ has 4 sides and 4 right angles with equal length opposite sides.
12. A ____________________________ is a quadrilateral with 4 equal sides.
13. The ____________________________ is the measurement of the total length of all the sides.
14. The ____________________________ is the measure of the surface of a figure.

Geometry Notes: Perimeter and Area

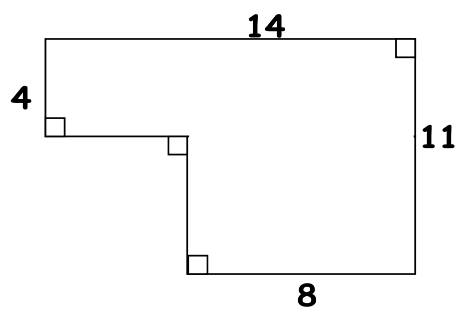
We are going to start our study of geometry with two-dimensional figures. We will look at the one-dimensional distance around the figure and the two-dimensional space covered by the figure. perimeter

The perimeter of a shape is defined as the distance around the shape. Since we usually discuss the perimeter of polygons (closed plane figures whose sides are straight line segment), we are able to calculate perimeter by just adding up the lengths of each of the sides. When we talk about the perimeter of a circle, we call it by the special name of circumference. Since we don't have straight sides to add up for the circumference (perimeter) of a circle, we have a formula for calculating this. circumference

> Circumference (Perimeter) of a Circle
>
> $$C = 2p\ r$$
>
> **r = radius of the circle**
> **π = the number that is approximated by 3.141593**

Example 1:

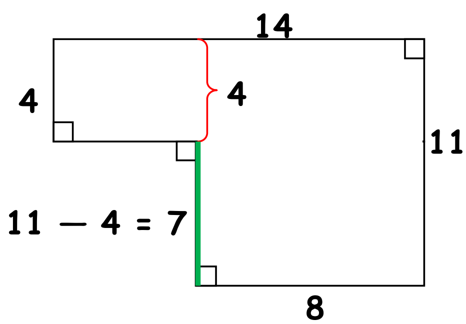
Find the perimeter of the figure below



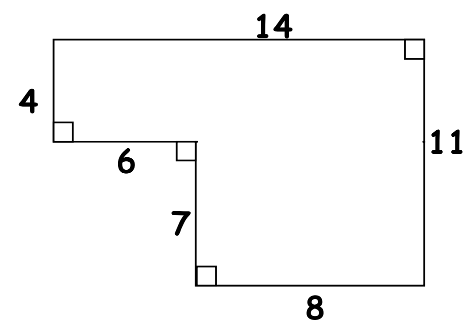
Solution:

It is tempting to just start adding of the numbers given together, but that will not give us the perimeter. The reason that it will not is that this figure has SIX sides and we are only given four numbers. We must first determine the lengths of the two sides that are not labeled before we can find the perimeter. Let's look at the figure again to find the lengths of the other sides.

Since our figure has all right angles, we are able to determine the length of the sides whose length is not currently printed. Let's start with the vertical sides. Looking at the image below, we can see that the length indicated by the red bracket is the same as the length of the vertical side whose length is 4 units. This means that we can calculate the length of the green segment by subtracting 4 from 11. This means that the green segment is 7 units.



In a similar manner, we can calculate the length of the other missing side using $14 - 8 = 6$. This gives us the lengths of all the sides as shown in the figure below.



Now that we have all the lengths of the sides, we can simply calculate the perimeter by adding the lengths together to get $4 + 14 + 11 + 8 + 7 + 6 = 50$. Since perimeters are just the lengths of lines, the perimeter would be 50 units.

area

The area of a shape is defined as the number of square units that cover a closed figure. For most of the shape that we will be dealing with there is a formula for calculating the area. In some cases, our shapes will be made up of more than a single shape. In calculating the area of such shapes, we can just add the area of each of the single shapes together.

rectangle

We will start with the formula for the area of a rectangle. Recall that a rectangle is a quadrilateral with opposite sides parallel and right interior angles.

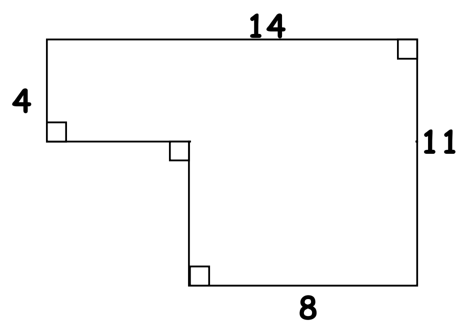
Area of a Rectangle

$$A = bh$$

b = the base of the rectangle
h = the height of the rectangle

Example 2:

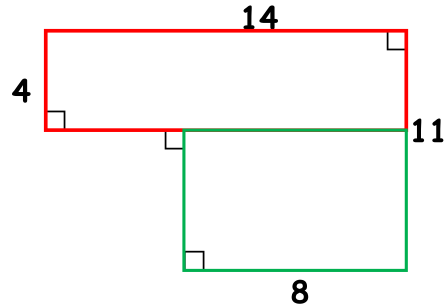
Find the area of the figure below

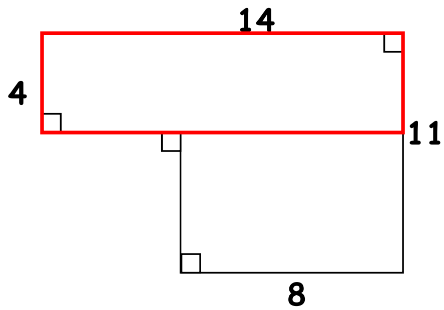


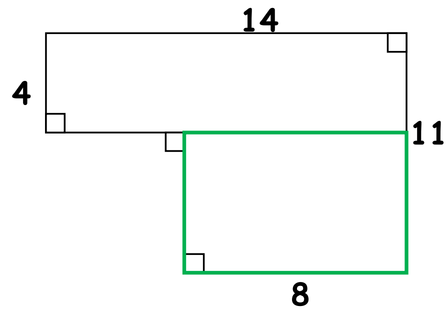
Solution:

This figure is not a single rectangle. It can, however, be broken up into two rectangles. We then will need to find the area of each of the rectangles and add them together to calculate the area of the whole figure.

There is more than one way to break this figure into rectangles. We will only illustrate one below.

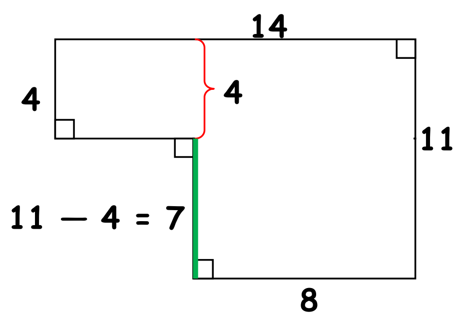






We have shown above that we can break the shape up into a red rectangle (figure on left) and a green rectangle (figure on right). We have the lengths of both sides of the red rectangle. It does not matter which one we call the base and which we call the height. The area of the red rectangle is $A = bh = 4 \times 14 = 56$

We have to do a little more work to find the area of the green rectangle. We know that the length of one of the sides is 8 units. We had to find the length of the other side of the green rectangle when we calculated the perimeter in Example 1 above. Its length was 7 units.



Thus the area of the green rectangle is $A = bh = 8 \times 7 = 56$. Thus the area of the whole figure is
area of red rectangle + area of green rectangle = 56 + 56 = 112. In

the process of calculating the area, we multiplied units times units. This will produce a final reading of square units (or units squared). Thus the area of the figure is 112 square units. This fits well with the definition of area which is the number of square units that will cover a closed figure.

Our next formula will be for the area of a parallelogram. A parallelogram is a quadrilateral with opposite sides parallel.

parallelogram

Area of a Parallelogram

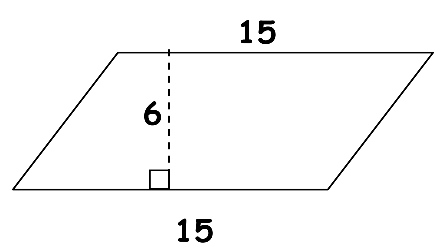
$$A = bh$$

b = the base of the parallelogram
h = the height of the parallelogram

You will notice that this is the same as the formula for the area of a rectangle. A rectangle is just a special type of parallelogram. The height of a parallelogram is a segment that connects the top of the parallelogram and the base of the parallelogram and is perpendicular to both the top and the base. In the case of a rectangle, this is the same as one of the sides of the rectangle that is perpendicular to the base.

Example 3:

Find the area of the figure below



Solution:

In this figure, the base of the parallelogram is 15 units and the height is 6 units. This mean that we only need to multiply to find the area of $A = bh = 15 \times 6 = 90$ square units.

You should notice that we cannot find the perimeter of this figure since we do not have the lengths of all of the sides, and we have no way to figure out the lengths of the other two sides that are not given.

Our next formula will be for the area of a trapezoid.

Area of a Trapezoid

$$A = \frac{1}{2}(b_1 + b_2)h$$

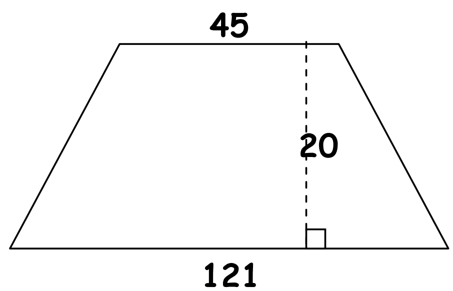
b_1 = the one base of the trapezoid
b_2 = the other base of the trapezoid
h = the height of the trapezoid

A trapezoid is a quadrilateral that has one pair of sides which are parallel. These two sides are called the bases of the trapezoid. The height of a trapezoid is a segment that connects the one base of the trapezoid and the other base of the trapezoid and is perpendicular to both of the bases.

trapezoid

Example 4:

Find the area of the figure



Solution:

For this trapezoid, the bases are shown as the top and the bottom of the figure. The lengths of these sides are 45 and 121 units. It does not matter which of these we say is b_1 and which is b_2. The height of the trapezoid is 20 units. When we plug all this into the formula, we get $A = \frac{1}{2}(b_1 + b_2)h = \frac{1}{2}(121 + 45)20 = 1660$ square units.

Our next formulas will be for finding the area of a triangle (a three-sided polygon). We will have more than one formula for this since there are different situations that can come up which will require different formulas

triangle

Area of a Triangle

For a triangle with a base and height

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

b = the base of the triangle
h = the height of the triangle

Heron's Formula for a triangle with only sides

$$A = \sqrt{s(s - a)(s - b)(s - c)}$$

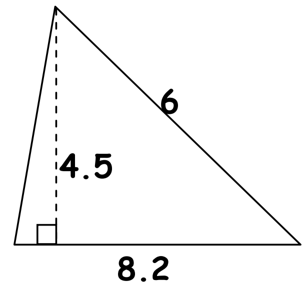
a = one side of the triangle
b = another side of the triangle
c = the third side of the triangle
s = ½ (a + b + c)

The height of a triangle is the perpendicular distance from any vertex of a triangle to the side opposite that vertex. In other words the height of triangle is a segment that goes from the vertex of the triangle opposite the base to the base (or an extension of the base) that is perpendicular to the base (or an extension of the base). Notice that in this description of the height of a triangle, we had to include the words "or an extension of the base". This is required because the height of a triangle does not always fall within the sides of the triangle. Another thing to note is that any side of the triangle can be a base. You want to pick the base so that you will have the length of the base and also the length of the height to that base. The base does not need to be the bottom of the triangle.

You will notice that we can still find the area of a triangle if we don't have its height. This can be done in the case where we have the lengths of all the sides of the triangle. In this case, we would use Heron's formula.

Example 5:

Find the area of the figure.



Solution:

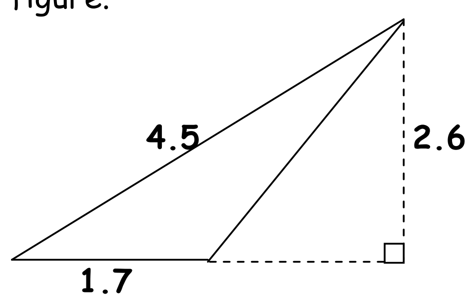
Notice that in this figure has a dashed line that is shown to be perpendicular to the side that is 8.2 units in length. This is how we indicate the height of the triangle (the dashed line) and the base of the triangle (the side that the dashed line is perpendicular to). That means we have both the height and the base of this triangle, so we can just plug these numbers into the formula to get

$A = \frac{1}{2}bh = \frac{1}{2}(8.2)(4.5) = 18.45$ square units.

Notice that the number 6 is given as the length of one of the sides of the triangle. This side is not a height of the triangle since it is not perpendicular to another side of the triangle. It is also not a base of the triangle, since there is no indication of the perpendicular distance between that side and the opposite vertex. This means that it is not used in the calculation of the area of the triangle.

Example 6:

Find the area of the figure.

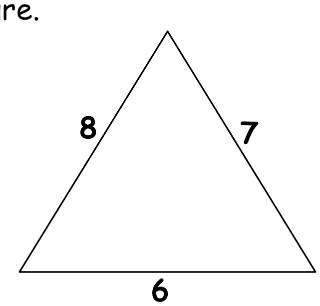


Solution:

In this figure there are two dashed lines. One of them is extended from the side of the triangle that has a length of 1.7. That dashed line is show to be perpendicular to the dashed line that has a length of 2.6. This is how we indicate that the dashed line that has a length of 2.6 is the height of the triangle and the base of the triangle is the side of length 1.7. The height here is outside of the triangle. Also, the dashed line that is extended from the base is not part of the triangle and its length is not relevant to finding the area of the triagnle. Since we have both the height and the base of this triangle, we can just plug these numbers into the formula to get $A = \frac{1}{2}bh = \frac{1}{2}(1.7)(2.6) = 2.21$ square units.

Example 7:

Find the area of the figure.



Solution:

You should notice that we do not have a height for this triangle. This means that we cannot use the formula that we have been using to find the area of this triangle. We do have the length of all three sides of the triangle. This means that we can use Heron's Formula to find the area of this triangle.

Heron's Formula

$A = \sqrt{s(s - a)(s - b)(s - c)}$

a = one side of the triangle
b = another side of the triangle
c = the third side of the triangle
s = ½ (a + b + c)

For this formula, it does not matter which side we label a, b, or c. For our purposes, we will let a be 6, b be 7, and c be 8. Now that we have a, b, and c, we need to calculate s so that we can plug a, b, c , and s into the formula. We get

$s = \frac{1}{2}(6+7+8) = \frac{1}{2}(21) = 10.5$. Now we can plug everything in to Heron's formula to find the area of this triangle to be $A = \sqrt{s(s-a)(s-b)(s-c)} = \sqrt{10.5(10.5-6)(10.5-7)(10.5-8)} = 20.33315257$ square units.

Another formula that we are interested in is the Pythagorean Theorem. This applies to only right triangles. The Pythagorean Theorem relates the lengths of the sides of a right triangle.

Pythagorean Theorem

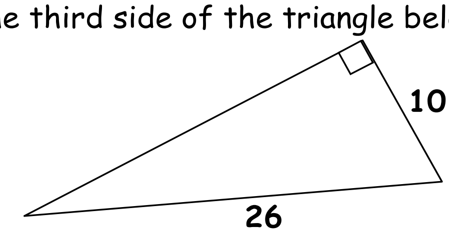
$$a^2 + b^2 = c^2$$

a = leg (one side of the triangle that makes up the right angle)
b = leg (another side of the triangle that makes up the right angle)
c = hypotenuse (side opposite the right angle)

When using the Pythagorean Theorem, it is important to make sure that we always use the legs of the triangle for a and b and the hypotenuse for c.

Example 8:

Find the length of the third side of the triangle below.



Solution:

The figure is a right triangle (as indicated by the box in one of the angles of the triangle). We need to decide what the side we are looking for is in terms of a leg or the hypotenuse of the triangle. The hypotenuse is the side of the triangle opposite the right angle. That would be the side that has length 26 in our picture. Thus c will be 26 in our formula. This means that the other two sides of the triangle are legs a and b. We will let a be 10, and we will thus be looking for b. When we plug all this into the formula, we get

$$a^2 + b^2 = c^2$$
$$10^2 + b^2 = 26^2$$
$$100 + b^2 = 676$$

We now need to solve this equation for b.

$$100 + b^2 = 676$$
$$b^2 = 576$$
$$b = \sqrt{576} = 24$$

Since we are asked for a length, we have that the third side is 24 units. (Notice that this is not square units since we are not finding an area).

We are now going to move on to circles. We already mentioned the perimeter (circumference) of a circle in the perimeter sections. We also need a formula for finding the area of a circle.

Area of a Circle

$$A = \pi r^2$$

r = radius of the circle
π = the number that is approximated by 3.141593

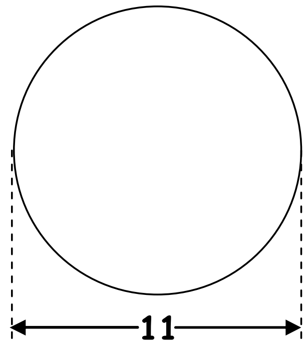
For circle problems we need to remember that the circumference (perimeter) of a circle is only the curved part of the circle. It does not include either the radius or diameter of the circle. In order to find the perimeter and area, we will need the radius of the circle. Recall that the diameter of a circle is a segment from on point on the circle to another point on the circle that passes through the center of the circle. A radius of a circle is half of a diameter (i.e. a segment that from one point on the circle to the center of the circle).

diameter

radius

Example 9:

Find the perimeter and area of the circle below.



Solution:

> Circumference (Perimeter) of a Circle
>
> $C = 2\pi r$
>
> **r = radius of the circle**
> **π = the number that is approximated by 3.141593**

The number 11 in the figure above is the length of the diameter of this circle. We need the radius to be able to use the formulas. The radius is half of the diameter. Thus $r = \frac{1}{2}(\text{diameter}) = \frac{1}{2}(11) = 5.5$.

We are now ready to find both the perimeter (circumference) and area by plugging 5.5 into each formula for r.

Perimeter:

$$C = 2\pi r = 2(\pi)(5.5) = 11\pi \approx 34.557519$$

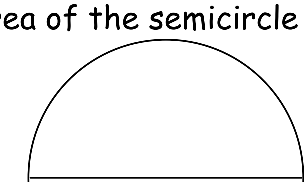
The answer 11π units is an exact answer for the perimeter. The answer 34.557519 units is an approximation.

Area:

$A = \pi r^2 = \pi(5.5)^2 = 30.25\pi \approx 95.0331778$ The answer 30.25π square units is an exact answer for the area. The answer 95.0331778 square units is an approximation.

Example 10:

Find the perimeter and area of the semicircle below.



120

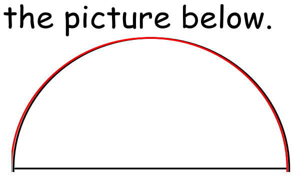
Solution:

In this problem, we have a semicircle (a half of a circle). The diameter of this half circle is 120. Thus the radius is $r = \frac{1}{2}(120) = 60$.

Perimeter:

We now can find the perimeter. We will find the circumference of the whole circle and then divide it by 2 since we only have half of a circle. This will give us $C = 2\pi(60) = 120\pi$ as the circumference for the whole circle and 60π units as the circumference of half of the circle.

Unfortunately this is not the answer for the perimeter of the figure given. The circumference of a circle is the curved part. The straight line segment in our figure would not have been part of the circumference of the whole circle, and thus it is not included as part of half of the circumference. We only have the red part shown in the picture below.



120

We still need to include the straight segment that is 120 units long. Thus the whole perimeter of the figure is
curved part + straight part = $60\pi + 120 \approx 308.495559$ units.

Area:

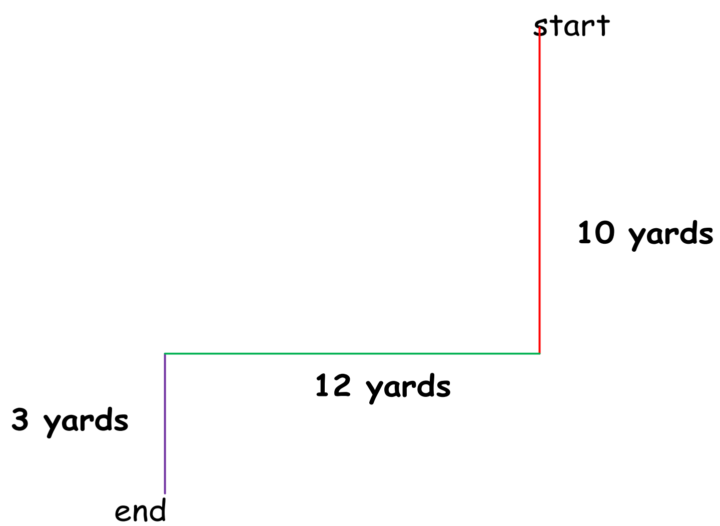
We can also find the area. Here we will plug 60 in for r in the area formula for a whole circle and then divide by 2 for the half circle. This will give us $A = \pi(60)^2 = 3600\pi$ square units for the area of the whole circle and 1800π square units for the area of the half circle. Now are we done with finding the area or is there more that we need to do like we did in finding the perimeter? If we think back to the definition of the area, (it is the number of square units needed to cover the figure) we should see that there is nothing further to do. The inside of the figure was covered already. We just have half as much inside as we did before.

Example 11:

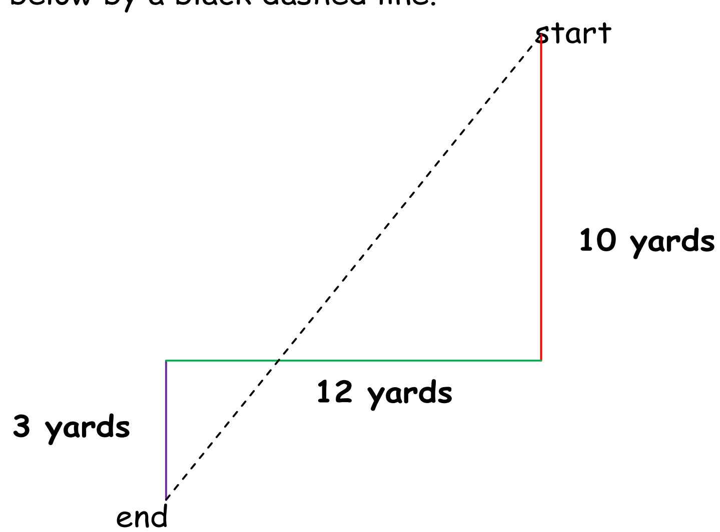
Walk 10 yards south, then 12 west and then 3 yards south. How far from the original starting point are you?

Solution:

To solve this problem, it would help to have a picture.

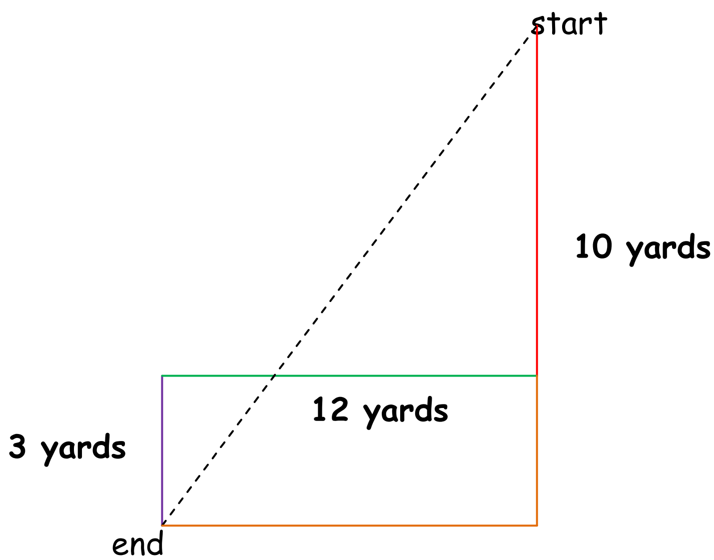


Above we can see a description of how we walked in the problem. What we are asked to find is how far it is from where we started to where we ended. That distance would be represented by a straight line from the start to the finish. This will be shown in the picture below by a black dashed line.



We need to figure out how long this line is. We might be tempted to say that we have two right triangles and that the line we are looking for is just the sum of each triangle's hypotenuse. The only problem with that is that we do not know the lengths of the legs of each of the right triangles. Thus we are not able to apply the Pythagorean Theorem in this way.

We are on the right track though. This is a Pythagorean Theorem problem. If we add a couple of line segments, we can create a right triangle whose hypotenuse is the line we are looking for.



As you can see above, the orange segments along with the red segment that was 10 yards and the dashed segment make up a right triangle whose hypotenuse is the dashed segment. We can figure out how long each of the legs of this triangle are fairly easily. The orange segment that is an extension of the red segment is another 3 yards. Thus the vertical leg of this triangle is 10 + 3 = 13 yards long. The orange segment which is horizontal is the same length as the green segment. This means that the horizontal leg of this triangle is 12 yards long. We can now use the Pythagorean Theorem to calculate how far away from the original starting point we are.

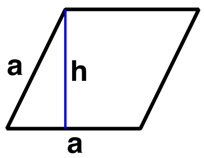
$$13^2 + 12^2 = c^2$$
$$169 + 144 = c^2$$
$$313 = c^2$$
$$\sqrt{313} = c \approx 17.6918$$

Here an exact answer does not really make sense. It is enough to approximate that we end up 17.6918 yards from where we started.

Worksheet 41.1 Perimeter and Area Calculation

Identify and Calculate the Area and Perimeter for each Polygon.

1)



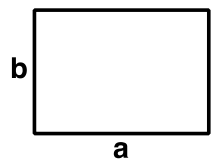
a = 5.5 ft   h = 4.94 ft

Area: ____________________

Perimeter: ____________________

Type: ____________________

2)



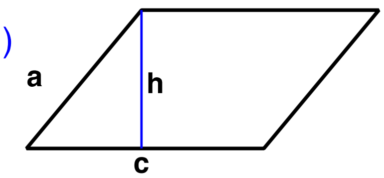
a = 7.2 inches   b = 5.1 inches

Area: ____________________

Perimeter: ____________________

Type: ____________________

3)



a = 6.33 cm

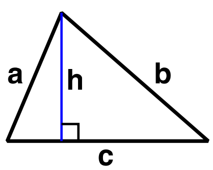
c = 9.8 cm   h = 5.7 cm

Area: ____________________

Perimeter: ____________________

Type: ____________________

4)



a = 5.75 ft   b = 8.05 ft

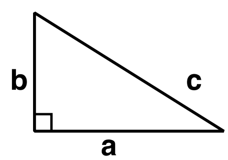
c = 8.3 ft   h = 5.3 ft

Area: ____________________

Perimeter: ____________________

Type: ____________________

5)



a = 7.8 cm   b = 4.9 cm

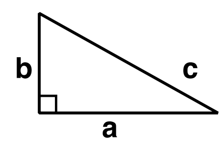
c = 9.21 cm

Area: ____________________

Perimeter: ____________________

Type: ____________________

6)



a = 7.4 ft   b = 4.1 ft

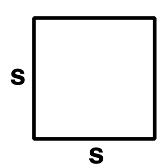
c = 8.46 ft

Area: ____________________

Perimeter: ____________________

Type: ____________________

7)



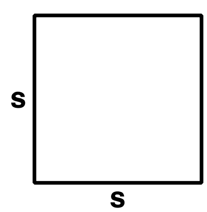
s = 5 cm

Area: ____________________

Perimeter: ____________________

Type: ____________________

8)



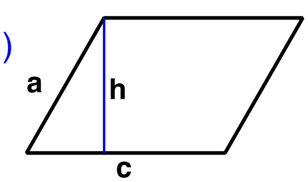
s = 6.9 cm

Area: ____________________

Perimeter: ____________________

Type: ____________________

9)



a = 6.01 inches

c = 8.2 inches   h = 5.6 inches

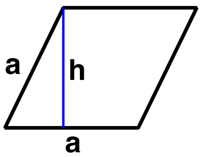
Area: ____________________

Perimeter: ____________________

Type: ____________________

Worksheet 41.1 Answers

1)



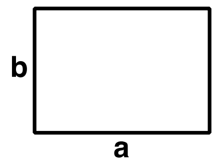
a = 5.5 ft   h = 4.94 ft

Area: 27.17 sq ft

Perimeter: 22 ft

Type: Rhombus

2)



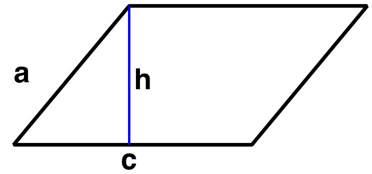
a = 7.2 inches   b = 5.1 inches

Area: 36.72 sq inches

Perimeter: 24.6 inches

Type: Rectangle

3)



a = 6.33 cm

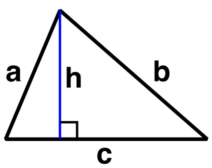
c = 9.8 cm   h = 5.7 cm

Area: 55.86 sq cm

Perimeter: 32.26 cm

Type: Parallelogram

4)



a = 5.75 ft   b = 8.05 ft

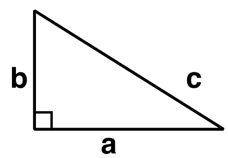
c = 8.3 ft   h = 5.3 ft

Area: 21.995 sq ft

Perimeter: 22.1 ft

Type: Common Triangle

5)



a = 7.8 cm   b = 4.9 cm

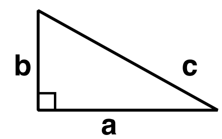
c = 9.21 cm

Area: 19.11 sq cm

Perimeter: 21.91 cm

Type: Right Triangle

6)



a = 7.4 ft   b = 4.1 ft

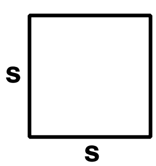
c = 8.46 ft

Area: 15.17 sq ft

Perimeter: 19.96 ft

Type: Right Triangle

7)



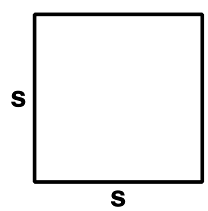
s = 5 cm

Area: 25 sq cm

Perimeter: 20 cm

Type: Square

8)



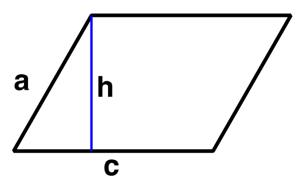
s = 6.9 cm

Area: 47.61 sq cm

Perimeter: 27.6 cm

Type: Square

9)



a = 6.01 inches

c = 8.2 inches   h = 5.6 inches

Area: 45.92 sq inches

Perimeter: 28.42 inches

Type: Parallelogram

Area Card Game

Find the Area

Introduce the concept of area to your third grader with this fun card game. You'll show your child how to determine the area of any object and help him begin thinking in terms of units as you create shapes out of playing cards. Count the cards you use or try applying multiplication to find the total area. Once you've got the hang of the game, assign different values to the cards!

What You Need:

- Deck of cards
- Several players

What You Do:

1. Decide on the unit value of the cards. If you decide on the number 2, each card will amount to two units and players will have to keep this value in mind when calculating the area of the figure you're building.
2. Have the players take turns placing one card at a time face down on a flat surface. Every card placed down should touch the side of another card. Cards should not overlap.
3. Every so often, interrupt the game and have one of the players calculate the area of the figure.

Helpful Tip: You may want to guide the players to build rectangles as they'll make it easier to calculate the area. Stop the game at intervals when rectangles have been completed. Then, introduce the formula for finding the area of a rectangle: length x width= area.

Play this game multiple times and assign the cards several different values in order to get as much practice as possible.

Exit Ticket

True or False?

______The distance around the outside of a polygon is the area.

______The area of a triangle is half the base times the height.

______A square is a rectangle.

______An isosceles triangle has no equal sides.

______All the angles of a triangle measure 360 degrees.

Exit Ticket

True or False?

______The distance around the outside of a polygon is the area.

______The area of a triangle is half the base times the height.

______A square is a rectangle.

______An isosceles triangle has no equal sides.

______All the angles of a triangle measure 360 degrees.