Questions on 4.7 HW? We are taking a quiz today...so go over the practice quiz below...

Practice Quiz

1. If the following points exist in $f(x)$, fill in what would they be in the inverse.
   $f(x)\colon \{(-1,2),(-3,4),(-5,6)\}$

   $f^{-1}(x)$: $\{(2,-1),(4,-3),(6,-5)\}$

2. If a linear function, f(x), has the slope $-\frac{7}{9}$, what would the slope be in the inverse, $f^{-1}(x)$?

   $-\frac{9}{7}$

3. If the dependent variable in f(x) is feet, what is the independent variable in $f^{-1}(x)$?

   feet

4. If the dependent variable in $f^{-1}(x)$ is perimeter, what is the independent variable in f(x)?

   perimeter

5. If a function, f(x), has the following domain and range, fill in the domain and range for its inverse, $f^{-1}(x)$.

   f(x) domain: $(-\infty, 4]$

   f(x) range: $(3, \infty)$

   $f^{-1}(x)$ domain: $(3,\infty)$

   $f^{-1}(x)$ range: $(-\infty,4]$

6. A function, f(x), and its inverse, $f^{-1}(x)$, reflect across the special line y= x .

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Find the inverse of each function. If the inverse is not a function, restrict the domain.

21. $f(x) = x^2; f^{-1}(x) =$

22. $g(x) = 2x + 4; g^{-1}(x) =$

23. $f(x) = (x+1)^2; f^{-1}(x) = -1 \pm \sqrt{x}$

24. $h(x) = \frac{1}{3}x + 6; h^{-1}(x) =$

25. $f(x) = \{(-3,5)(-2,-9)(-1$

$f^{-1}(x) = \{(\ ,\ )(\ ,$

$y = (x+1)^2$

$\sqrt{x} = \sqrt{(y+1)^2}$

$\pm\sqrt{x} = y+1$
$\quad -1 \qquad\qquad -1$

$-1 \pm \sqrt{x} = y$

① Switch x & y.
② Solve for y.

Write the piecewise-defined fun

26. $h(x) = |x+3|$

27. $f(x) = |x^2 - 4| + 1$

28. $g(x) = 5|x+3|$

29. $f(x) = |x^2 - 16|$

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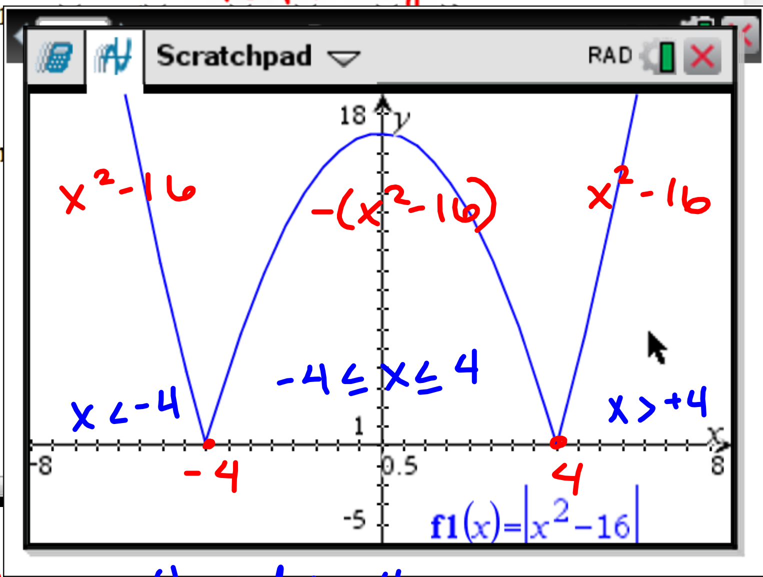
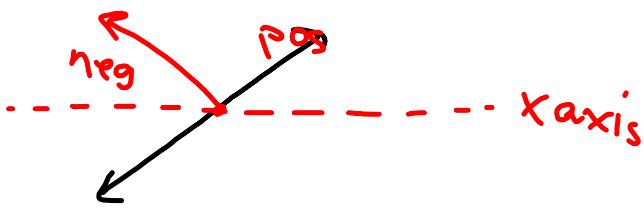


$$f(x) = \begin{cases} (x^2-16), & x < -4 \text{ and } x > 4 \\ -(x^2-16), & -4 \le x \le 4 \end{cases}$$



5.1 How Do You Know That?

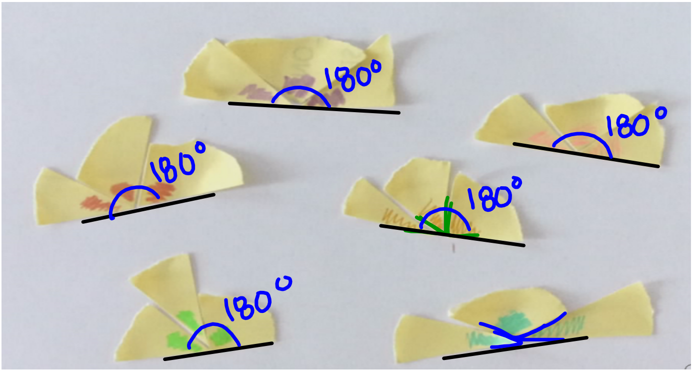
A Develop Understanding Task

You probably know that the sum of the interior angles of any triangle is 180°. (If you didn't know that, you do now!) But an important question to ask yourself is, "How do you know that?"

We know a lot of things because we *accept it on authority*—we believe what other people tell us; things such as the distance from the earth to the sun is 93,020,000 miles or that the population of the United States is growing about 1% each year. Other things are just defined to be so, such as the fact that there are 5,280 feet in a mile. Some things we accept as true based on experience or repeated experiments, such as the sun always rises in the east, or "I get grounded every time I stay out after midnight." In mathematics we have more formal ways of deciding if something is true.

Experiment #1

1. Cut out several triangles of different sizes and shapes. Tear off the three corners (angles) of the triangle and arrange the vertices so they meet at a single point, with the edges of the angles (rays) touching each other like pieces of a puzzle. What does this experiment reveal about the sum of the interior angles of the triangles you cut out, and how does it do so?



2. Since you and your classmates have performed this experiment with several different triangles, does it guarantee that we will observe this same result for *all* triangles? Why or why not?

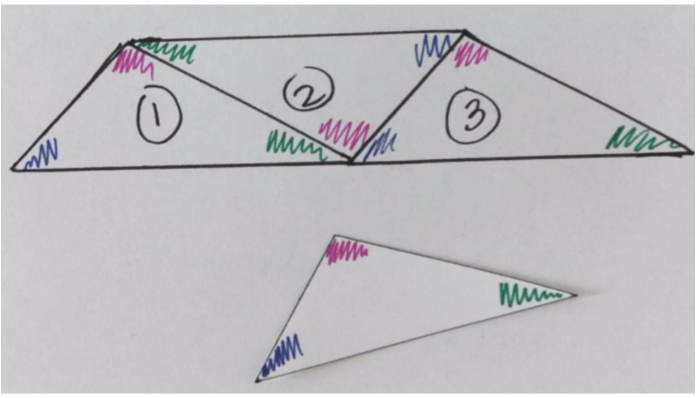
The interior ∠ sum of a △ is 180°

Experiment #2

Perhaps a different experiment will be more convincing. Cut out another triangle and trace it onto a piece of paper. It will be helpful to color-code each vertex angle of the original triangle with a different color. As new images of the triangle are produced during this experiment, color-code the corresponding angles with the same colors.

Locate the midpoints of each side of your cut out triangle by folding the vertices that form the endpoints of each side onto each other.

Rotate your triangle 180° about the midpoint of one of its sides. Trace the new triangle onto your paper and color-code the angles of this image triangle so that corresponding image/pre-image pairs of angles are the same color.



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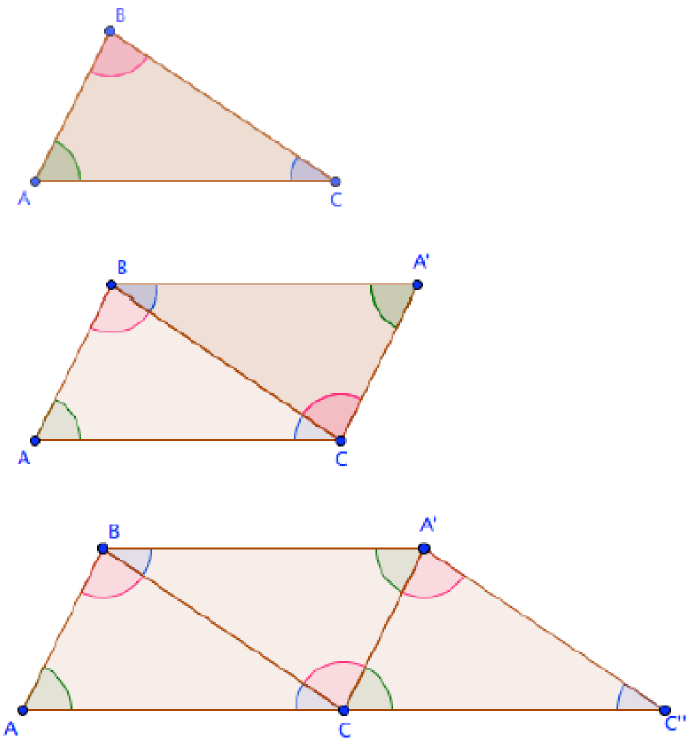
Now rotate the new "image" triangle 180° about the midpoint of one of the other two sides. Trace the new triangle onto your paper and color-code the angles of this new image triangle so that corresponding image/pre-image pairs of angles are the same color.

3. What does this experiment reveal about the sum of the interior angles of the triangles you cut out, and how does it do so?

4. Do you think you can rotate *all* triangles in the same way about the midpoints of its sides, and get the same results? Why or why not?

Examining the Diagram

Experiment #2 produced a sequence of triangles, as illustrated in the following diagram.



Here are some interesting questions we might ask about this diagram:

5. Will the second figure in the sequence always be a parallelogram? Why or why not?

6. Will the last figure in the sequence always be a trapezoid? Why or why not?

Homework

Finish 5.1 "Ready, Set, Go"