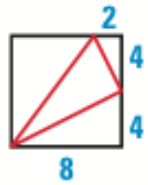


In groups of two to four people, work together to solve each of the following problems. Each person needs to work out each problem on their own paper.

1. The shot used in men's shot put has a volume of about 905 cubic centimeters. Using the formula for the volume of a sphere,  $V = \frac{4}{3}\pi r^3$ , find the radius of the shot.

2. This figure is a square with a triangle inside. Find a radical expression for the perimeter of the triangle in simplified form. You're going to have to use the Pythagorean Theorem.



3. You have a \$10 gift card for Frizelle Enos. The day you go the store has a sale of 15% off all footwear. Write a function representing the price of a pair of boots if you only use the \$10 gift card. Write a second function representing the price of the boots using only the 15% footwear discount.

Gift card function:

15% off function:

Compose the two functions to represent the store applying the \$10 gift card before the 15% discount. Simplify.

Compose the two functions to represent the store applying the 15% discount before the \$10 gift card. Simplify.

Which scenario gives you the better deal?

What is the price difference for a \$64 pair of boots?

(continued on back)

5. Use this CVS receipt to define two functions, one for the \$5 off "CVS Coupon" and the other for the "25% CVS Coupon". Compose them both ways and simplify. Find the pre-discount purchase amount, then plug it into both compositions. What is the price difference between the two methods of applying the discount? Which method gives the customer a better deal (\$5 off before 25% discount, or the other way around)? Which method did CVS use?

1 CAL ENVELOPE 100C	3.19T
1 DIXIE HD PLAT 24CT	3.39T
1 OS HE DEO ORI 3.25	3.69T
1 OS HE FRS DEO TWIN	5.99T
1 CVS COUPON	5.00 -
1 25% CVS COUPON	2.82 -
4 ITEMS	
SUBTOTAL	8.44
CA 8.25% TAX	.70
<b>TOTAL</b>	<b>9.14</b>

4. A bowling ball has a surface area of about 232 square inches. Using the formula for the surface area of a sphere,  $S = 4\pi r^2$ , find the radius of the bowling ball.

5. The ancient Babylonians used this function and function composition to approximate the square root of a number. They started with a guess, and then composed the function over and over until their answer got close enough for their immediate purposes. We are going to find the square root of 2, accurate to four decimal places.

$$f(x) = \frac{x + \frac{n}{2}}{2}$$

In this function, n is the number whose square root we are trying to calculate (so put 2 in for n for all of your calculations) and x is your first guess. Start by plugging your x into the function  $f(x)$ , then plugging your result into the function again  $f(f(x))$ , then again  $f(f(f(x)))$  and then one more time  $f(f(f(f(x))))$ . The results will converge onto our answer, 1.4142...

Each group member needs to choose and use a different x value for their first calculation (I recommend 1, 2, 3, or 4). Each of your calculations will get closer and closer to our goal even though you all started with different x values. Write each intermediate value here as you go along. Show your setup even though you will use a calculator.

$$f(x)$$

$$f(f(x))$$

$$f(f(f(x)))$$

$$f(f(f(f(x))))$$