

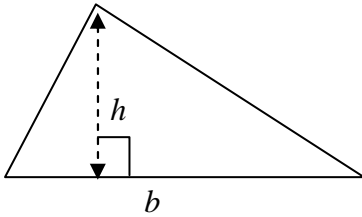
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## Area of Shaded Regions Algebra 1

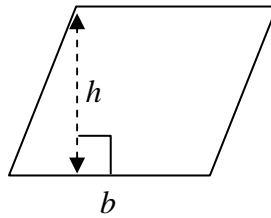
In the next few lessons we will work with area formulas that you should be familiar with from previous years. This work will reinforce concepts about area and measurement. First, some review of basic shapes and their areas:

### Triangles



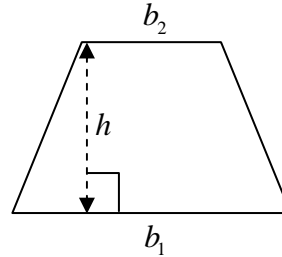
$$A = \frac{1}{2}bh$$

### Parallelograms



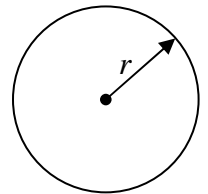
$$A = bh$$

### Trapezoids



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

### Circles



$$A = \pi r^2$$

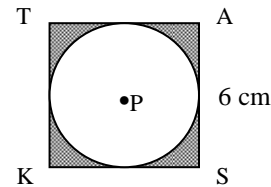
**Exercise #1:** Consider the circle inscribed in the square TASK shown below.

(a) Find the area of the square.

(b) Find the exact area of the circle.

(c) Express the shaded area in terms of  $\pi$ .

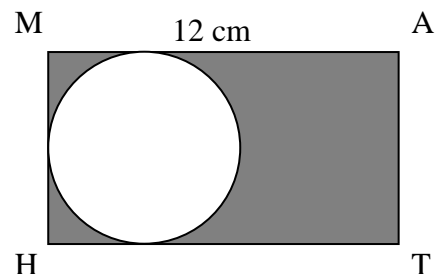
(d) Express the area of the shaded region to the nearest hundredth.



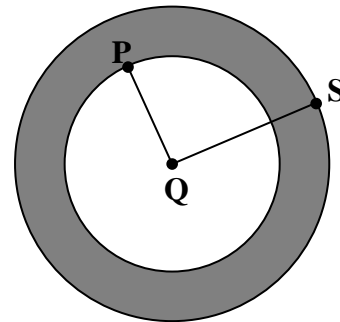
**Exercise #2:** In the following diagram MATH is a rectangle with an inscribed circle. The circle has a diameter of 8 centimeters and the rectangle has a height of 12 centimeters (as shown).

(a) Find the exact area of the shaded region.

(b) Find the area of the shaded region to the nearest *tenth*.

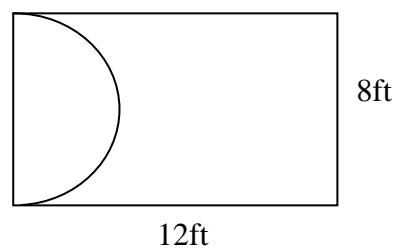


**Exercise #3:** Find the area of the shaded region below in terms of  $\pi$  if  $QP = 8$  ft and  $QS = 12$  ft.



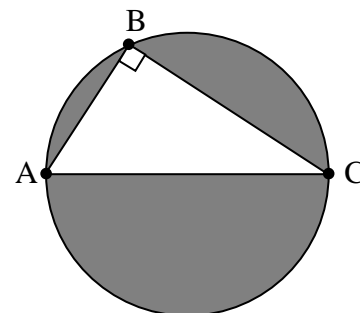
**Exercise #4:** Mrs. White has a rectangular foyer in her home. She wants to lay hardwood flooring down on all of the area except for the semi circular area in front of the entrance door.

- (a) Calculate to the nearest square foot how much hardwood flooring Mrs. White will need. Use the accompanying diagram below.



- (b) Use your answer from part (a) to calculate the cost of the hardwood flooring if it is priced at \$2.25 per square foot.

**Exercise #5:** In the following diagram, right triangle  $ABC$  is inscribed in a circle. It is given that  $AC = 26$ ,  $BC = 24$  and  $AC$  is the diameter of the circle. Determine the area of the shaded region to the nearest *hundredth*.



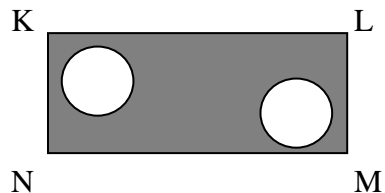
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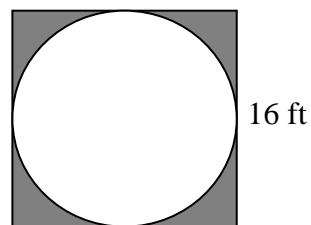
## Area of Shaded Regions Algebra 1 Homework

### Applications

1. Two circles having a diameter of 4 inches are within rectangle KLMN. It is given that  $LM = 7$  inches and  $NM = 12$  inches. Find the area of the shaded region to the nearest tenth of a square inch.

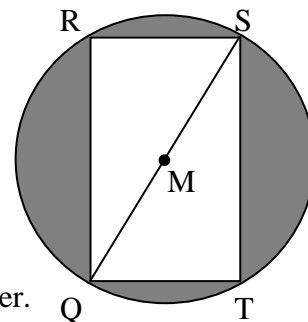


2. A circle is drawn in a square whose side measures 16 feet as shown below. Find the exact area of the shaded region.



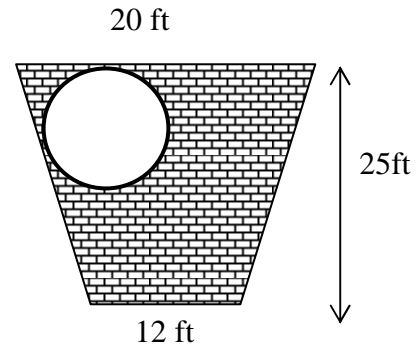
3. Rectangle QRST is drawn in circle M. Diameter  $QS = 10$  cm and  $ST = 8$  cm.

(a) Find QT.

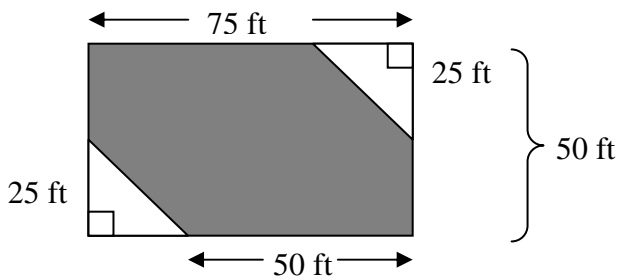


- (b) Find the area of the shaded region to the nearest *tenth* of a square centimeter.

4. Mr. Jones has a patio in the shape of a trapezoid. A round fountain having a circumference of  $14\pi$  linear feet is placed in the corner as shown in the accompanying diagram. To the nearest square foot, how much of the patio's area is *not* taken up by the fountain? Recall that the circumference of a circle is calculated using  $C = \pi \cdot D$ .



5. Calculate the number of square feet in the shaded region below where two congruent right triangles are located within a rectangle.



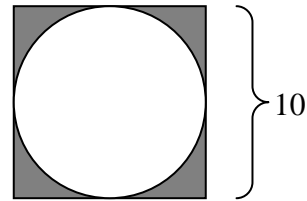
### Reasoning

6. Brian was attempting to calculate the exact area of the shaded region shown below, where a circle is inscribed in a square. He did the following calculations.

$$A_{\text{square}} = 10 \cdot 10 = 100$$

$$A_{\text{circle}} = \pi(5)^2 = 25\pi$$

$$A_{\text{shaded}} = 100 - 25\pi = 75\pi$$



Explain the error that Brian made **and** calculate the true area of the shaded region to the nearest *hundredth*.