# Packet 15: Scale Drawings and Circle Measurements

Dear Parents/Guardians,

Packet 15 introduces students to scale, scale drawings, and measurements with circles. Students draw figures with given scale factors and analyze their dimensions. Students explore circles and use the circumferences and areas of circles to solve problems.

## Scale Drawings

Students draw figures to scale of the original.



Note all of these figures look the same, but are scaled differently.

Students analyze the figures and note the patterns and relationships they find.

### **Circumference of Circles**

A <u>circle</u> is a closed curve in a plane consisting of all points at a fixed distance (called the <u>radius</u>) from a specified point (called the <u>center</u>).



The <u>circumference</u> is the length of the circle, or the distance around it. The circumference of a circle is approximately triple the diameter. The exact number of diameters that go around the circumference length is pi, or  $\pi$ . C =  $\pi d$ 

Students solve problems involving the circumferences of circles.

Example: Calculate the diameter of a soup can whose circumference is 32 cm. We know that C = 32 cm and  $\pi \approx 3.14$  (approximately 3.14).

	$C = \pi d$
Substitute in the known values.	32≈3.14d
Divide both sides by 3.14.	10.2 ≈ d

#### Area of Circles

The <u>area</u> of a 2-dimensional figure is the size of the figure, measured in square units. Students derive the formula for areas of circles. The area of a circle is the square of its radius multiplied by pi.

 $A = \pi r^2$ 

Students solve problems involving areas of circles.

Example: Jen drew the largest circle she could inside a square that is 12 cm on each side. What is the approximate area of the shaded region?



To find the area of the shaded region, subtract the area of the circle from the area of the square.

The diameter of this circle is the same as the square's side length. The side of the square is 12 cm.

The radius is half the diameter, or 6 cm.

area of the square	area of the circle	area of the shaded region
$A = s^{2}$ $A = 12^{2}$ $A = 12 \times 12 = 144 \text{ cm}^{2}$	$A = \pi r^{2}$ $A = 3.14(6^{2})$ $A \approx 3.14(6^{2})$ $A \approx 113.04 \text{ cm}^{2}$	$A = A_{square} - A_{circle}$ $A \approx 144 - 113.04$ $A \approx 30.96 \text{ cm}^2$



# By the end of the packet, your student should know...

Scale factor and how to read, make, and analyze drawings made to scale Lesson 15.1

Make sense of pi  $(\pi)$ , as pi is not a rational number. Use the exact value for pi as well as approximations to solve circumference problems Lesson 15.2

Go through a derivation of the area formula for circles and use it to solve problems Lesson 15.3

#### **Additional Resources**

Resource Guide (RG) Part 2, pages 47, 54, and 55

Radii, Diameters, and Circumference: http://youtu.be/Yb1HYyBfLfc