Learning Outcome:
Estimate value of pi and expressions containing pi to nearest hundredths.
8.NS.A.2

1 Complete the following table. (Use 3.14 for π)

Radius	Diameter	Circumference	Area
	1 inch		

2 State whether true or false.

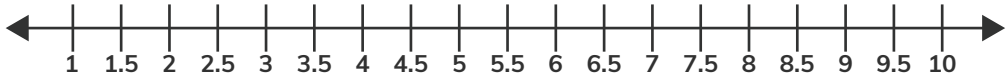
a) $2\pi + 2 > 8$ ☐

b) π is exactly equal to 22/7. ☐

3 How many integers are there between π and π^2?

☐

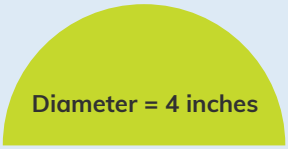
4 Estimate the value of $(\pi^2 - 5)$ to the nearest tenth and plot it on the number line.



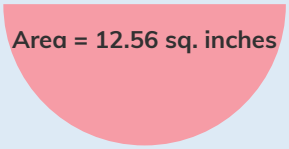
5 Estimate the circumference of the pizza with a diameter of 8 inches to the nearest hundredth. (Use 3.14 for π)

Circumference = ☐ inches

6 Compare the two semicircles using >, <, or =.



☐



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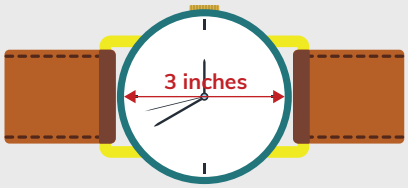
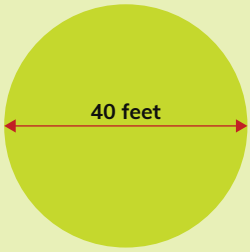
1 Find the area of a watch face with a diameter of 3 inches. (Use 22/7 for π)



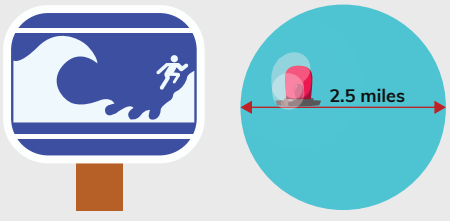
2 You are riding a merry-go-round which has a circular platform of radius 3 feet. What is the distance traveled in one revolution? (Use 3.14 for π)

3 Your friend calculated the circumference of a playground to be 100 feet. If the diameter of the playground is 40 feet, what is the value of "π" used? Was it a good approximation?

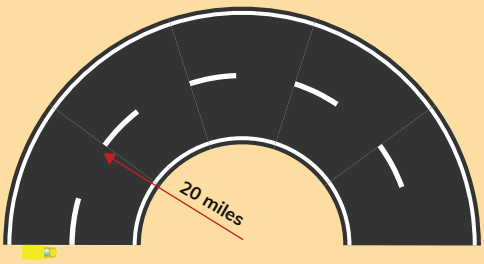


4 Estimate the area covered by a frisbee, if its circumference is 50.24 inches. (Use 3.14 for π)

5 A tsunami warning siren can be heard up to 2.5 miles in all the directions. Estimate the area up to which the siren can be heard? (Use 3.14 for π)



6 Your car has sufficient fuel to cover a distance of 80 miles. There's a semicircular road with a radius of 20 miles. Will you be able to cross it?



Learning Outcome:
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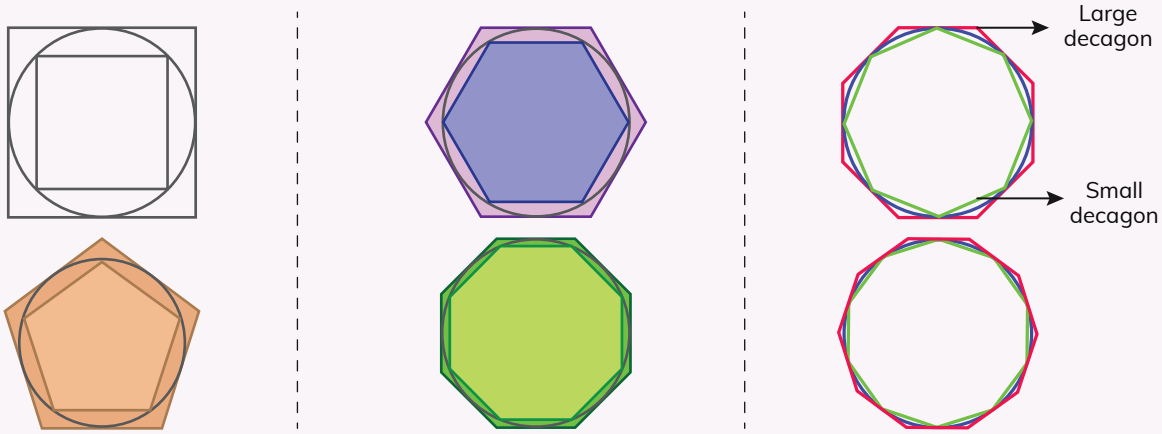
8.NS.A.2

We just held our very own olympics! And now, here's another Olympian challenge for you. One which was similarly solved in ancient Greece, the birthplace of the Olympics! You know how to derive π with the help of a circle, but can you do it with regular polygons? We know that π is the ratio of circumference to diameter. Let's look at a method to estimate the value of π using regular polygons. The method uses the idea that if a circle is inscribed and circumscribed by the same polygon, then the circumference of the circle lies between the perimeters of the inscribed and circumscribed polygons. Let's use this idea, here, to approximate the value of π. Follow the given steps to see how that can be done.

- Measure the diameter of the circle to the nearest millimeter.
- Measure the perimeter of the outermost polygon using a ruler to the nearest millimeter.
- Find the ratio of the perimeter of the outermost polygon to the diameter of the circle.
- Measure the perimeter of the innermost polygon to the nearest millimeter.
- Find the ratio of the perimeter of the innermost polygon to the diameter of the circle.
- Now, find the average of these two ratios.



Note: Above mentioned 6 steps have to be repeated for all the five shapes given.
It's time to tabulate your findings.

Sides	Diameter of circle	Perimeter of larger polygon	Perimeter of smaller polygon	$\frac{\text{Larger perimeter}}{\text{Diameter}}$ **(Ratio 1)**	$\frac{\text{Smaller perimeter}}{\text{Diameter}}$ **(Ratio 2)**	Average of ratios = $\frac{\textbf{Ratio 1 + Ratio 2}}{2}$
4						
5						
6						
8						
10						

Based on the table, what can you conclude about π?

In earlier days, Greek mathematicians used this method to approximate the value of π from a polygon with 96 sides. Do you think their approximation was accurate? Explain.