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BYJU'S
The Learning App

CREATE WITH MATH

Worksheet Solutions

Foundation

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Foundation GRADE 8

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.

1 1.5 2 2.5 3 3.5 4 4.5 5 5.5 6 6.5 7 7.5 8 8.5 9 9.5 10

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 =.

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

Radius	Diameter	Circumference	Area
	1 inch		

Given:

Diameter (D) = 1 inch

Solution:

Radius = D/2 = 1/2 = 0.5 inch

Circumference = πD = 3.14 x 1 = 3.14 inches

Area = $(\pi/4)D^2$ = (3.14/4) x 1^2 = 0.785 sq. inch

Radius = 0.5 inch
Circumference = 3.14 inch
Area = 0.785 sq. inch

2 State whether true or false.

a) $2\pi + 2 > 8$

b) π is exactly equal to 22/7.

Given:

a. $2\pi + 2 > 8$

b. $\pi = 22/7$

Solution:

We know that $\pi \sim 3.14$.
So,
$2\pi + 2 = 2 \times 3.14 + 2 = 8.28 > 8$
Hence, expression 'a' is true.

And,

π is approximately equal to 22/7 or 3.14.
Hence, statement 'b' is false.

a. True
b. False

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

Given:

π

π^2

Solution:

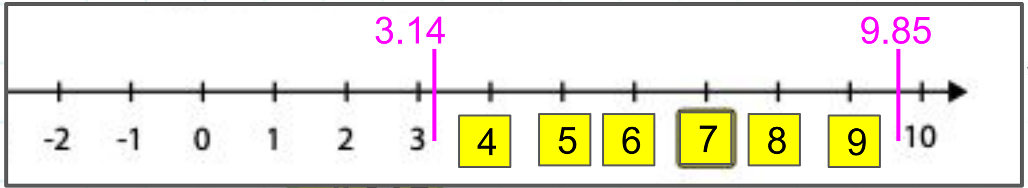
We know that,

$\pi \sim 3.14$

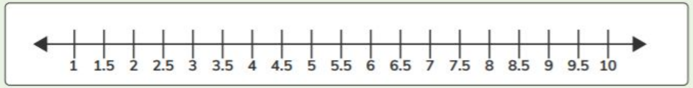
$\pi^2 \sim 9.85$

Hence, the integers between 3.14 and 9.85 are 4 , 5 , 6 , 7 , 8 , and 9 (from the number line).

Answer: 4, 5, 6, 7, 8, and 9



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



Given:

$\pi^2 - 5$

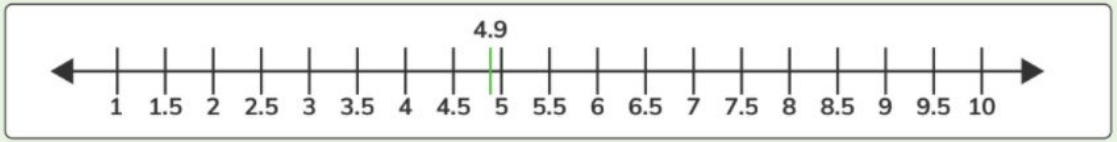
Solution:

$\pi^2 - 5 = 3.14^2 - 5$

$= 9.85 - 5$

$= 4.85 \sim 4.9$ (rounded off to the nearest tenth)

Answer: 4.9



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

Circumference = ______ inches

Given:

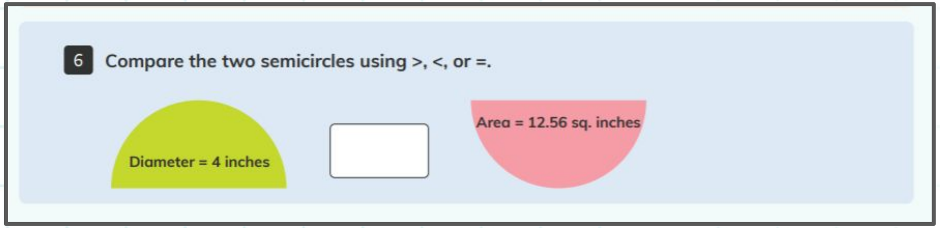
Diameter (D) = 8 inches

Solution:

Circumference = $\pi D = 3.14 \times 8$

Circumference = 25.12 inches

Circumference = 25.12 inches



Given:

For semicircle 1, diameter (D_1) = 4 inches
For semicircle 2, area (πD_2^2) = 12.56 sq. inches

Solution:

D_1 = 4 inches

$(\pi/4)D_2^2$ = 12.56 sq. inches
$\Rightarrow D_2^2 = (4 \times 12.56)/\pi = 4 \times 12.56 \div 3.14$
$\Rightarrow D_2^2 = 4 \times 4 = 16$
$\Rightarrow D_2$ = 4 inches

So, on comparing the diameter of both the semicircles (D1 and D2),

$D_1 = D_2$

Area of Semicircle 1 = Area of Semicircle 2
Diameter of Semicircle 1 = Diameter of Semicircle 2

Application

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Application 8

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

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)

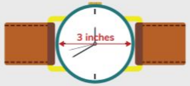
3 Your friend calculated the circumference of a playground to be 100 feet. If the diameter of the playground is 40 feet, what is the value of "π" used? Was it a good approximation?

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?

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



Given:

$D = 3$ inches
$\pi = 22/7$

Solution:

$$\text{Area} = (\pi/4)D^2 = (22/7)/(4) \times 3^2$$

$$= 22/28 \times 9$$

$$= 7.07 \text{ sq. inches}$$

Area = 7.07 sq. inches

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)

Given:

Radius (r) = 3 feet

$\pi = 3.14$

Solution:

Distance traveled in one revolution = Circumference of merry-go-round

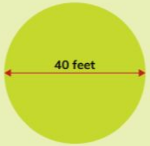
$= 2\pi r$

$= 2 \times 3.14 \times 3$

$= 18.84$ feet

Answer: 18.84 feet

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?



Given:

Circumference of playground = 100 feet

Diameter (D) = 40 feet

Let the approximation of pi that your friend used be π’

Solution:

Circumference = π’D

100 = π’ x 40

⇒ π’ = 100/40 = 2.5

The π value used here is 2.5. No, it wasn't a good approximation since the ideal value of pie lies between 3.1 and 3.2.

Answer: 2.5 , No it wasn’t a good approximation

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

Given:

Circumference = 50.24 inches

$\pi = 3.14$

Solution:

Circumference = $\pi D = 50.24$

$\Rightarrow D = 50.24/3.14$

$\Rightarrow D = 16$ inches

Area = $(\pi/4)D^2$

$= (3.14/4) \times 16^2$

$= 200.96$ sq. inches

Area = 200.96 sq. inches

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)

Given:

Distance upto which the siren can be heard = Radius (r)

r = 2.5 miles

Solution:

Area = πr^2

$= 3.14 \times 2.5^2$

$= 19.625$ sq. miles

Area = 19.625 sq. miles

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?

Answer: Yes

Given:

Distance that can be covered with the fuel = 80 miles

Radius (r) = 20 miles

Solution:

To check if the vehicle will be able to complete the semicircular road, we need to find the circumference of the semicircle,

Circumference of semicircle = πr

$= 3.14 \times 20$ miles

$= 62.8$ miles

Since the semicircular road has a circumference of 62.8 miles, the car will be able to cross the road with its fuel.

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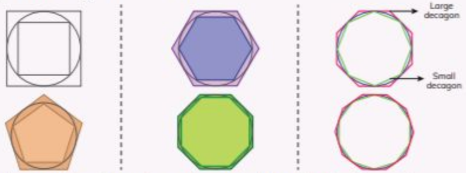
Create GRADE 8

Learning Outcome:
Estimate value of pi and expressions containing pi to nearest hundredths.
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 = $\frac{\text{Ratio 1} + \text{Ratio 2}}{2}$
4						
5						
6						
8						
10						

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

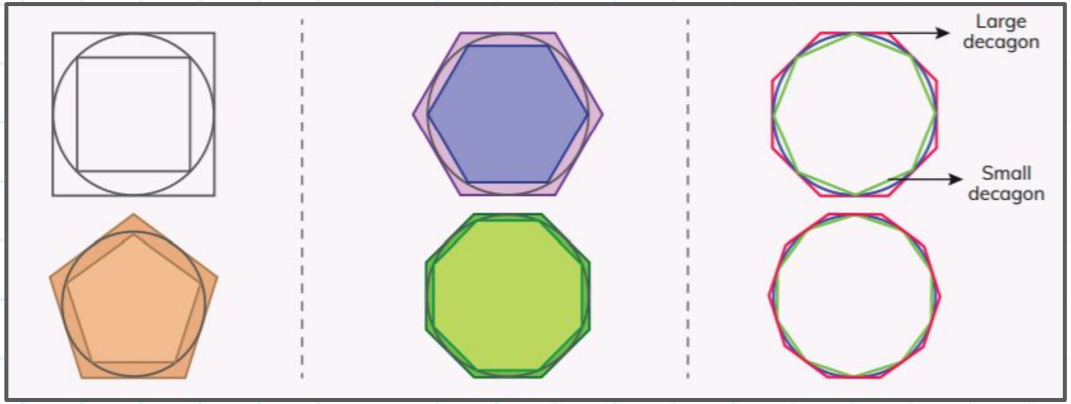
In earlier days, Greek mathematicians used this method to approximate the value of π from a polygon with 96 sides. Do you think their approximation was accurate? Explain.

Create

Given:

- 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.

By using the above steps, we measure all the figures given below and tabulate the data into a table.



Tabulating the data in the following table:

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 = $\frac{\text{Ratio 1 + Ratio 2}}{2}$
4	10	40	28	4	2.8	3.4
5	10	35	30	3.5	3	3.25
6	10	36	30	3.6	3	3.3
8	10	35	30	3.5	3	3.25
10	10	32	30	3.2	3	3.1

Ratio 1 = Larger perimeter/Diameter
Ratio 2 = Smaller perimeter/Diameter
Average ratio = (Ratio 1 + Ratio 2)/2

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

From the last column of the table, the value of π lies between 3.1 and 3.4

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.

Approximation of π is more accurate if we increase the number of sides since a circle can be considered as a polygon with infinite number of sides.