



G7  
Basic

G8  
Advanced

# Helping With Math

GRADES

## Spatial Skill: Circles

*Suitable for students*  
**aged 11-13**



This pack is suitable for learners aged 11-13 years old or 7th to 8th grades.

The content covers fact files and relevant basic and advanced activities of circle topics that aim to develop and strengthen the learners' spatial skills.

## Happy New Year's Eve!



**New Year's Eve** is one of the most celebrated holidays in the world. It is basically the last day of the Gregorian calendar. Most of the parties, countdowns, family gatherings happen on December 31st to welcome the New Year.

## Circle



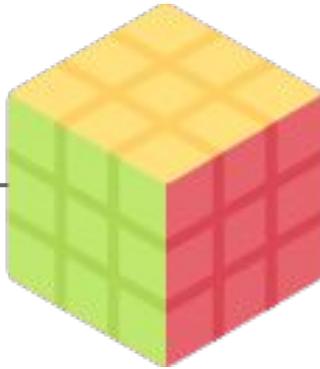
- A circle is the set of all those points in a plane whose distance from the fixed point remains constant.
- The fixed point is called the **center** and the constant distance is known as the **radius**.
- The line segment passing through the centre of a circle and having its endpoints on the circle is called the **diameter** of the circle.



## SPATIAL SKILL

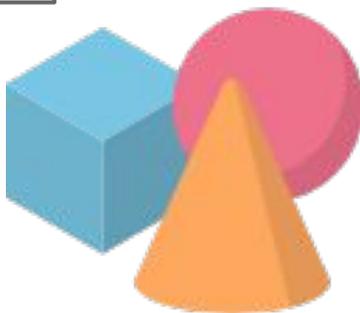


**Spatial skill** is the ability to comprehend, reason, and recall spatial relations among objects or space.



There are four types of spatial skills: spatial perception, spatial visualization, mental folding and mental rotation.

According to experts, children use geometrical strategies to solve math problems, some includes mental number lines, geometric figures, and information about locations in space.



## SPATIAL SKILL



Experts also concluded that people who use spatial representation (including spatial relationships) in dealing with math problems are more likely to get better scores.

- Children who have displayed better spatial skills when compared to their peers have better academic achievement in math.
- How do we develop the spatial skills of young learners? Researchers suggest that children must play with building blocks, puzzles, video games, and other spatial materials to help develop their spatial skills.



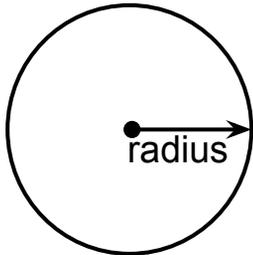
Which among these items do you play and enjoy the most? Why? Share your answer below.



## PARTS OF CIRCLE

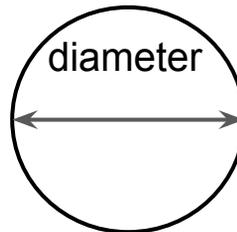
### Radius

- Radius measures half the length of the diameter.



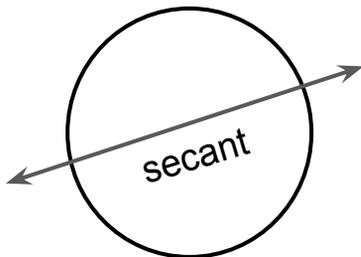
### Diameter

- Diameter measures 2 times the length of the radius.



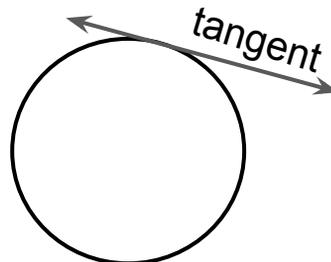
### Secant

- It is a line that intersects the circle at exactly two points.



### Tangent

- It is a line that intersects that circle at exactly one point.



## CIRCUMFERENCE OF A CIRCLE

- Circumference of a circle is considered as the perimeter of a circle.
- It is a distance around a circle or what we call the arc length.
- Imagine a straight line bended to connect its two ends. The length of this line is the circumference of the circle formed as shown below



**Formula:  $C = 2\pi r$**   
where  $r$  is the radius of the circle



## EXAMPLES

Compute the circumference of the circle with the following radius.

a.  $r = 3\text{m}$

$$C = 2\pi r$$

$$C = 2\pi(3\text{m})$$

$$C = 6\pi$$

$$C = 18.85 \text{ m}$$

b.  $r = 5\text{m}$

$$C = 2\pi r$$

$$C = 2\pi(5\text{m})$$

$$C = 10\pi$$

$$C = 31.42\text{m m}$$

c.  $r = 0.5\text{m}$

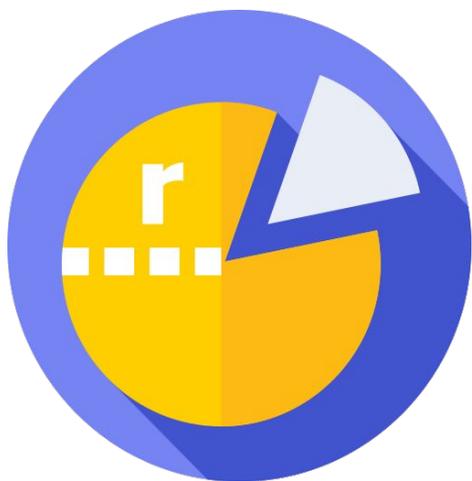
$$C = 2\pi r$$

$$C = 2\pi(0.5\text{m})$$

$$C = \pi$$

$$C = 3.14 \text{ m}$$

## AREA OF A CIRCLE



Area of a circle refers to how much space the circle takes upon a surface.

Formula:  $A = \pi r^2$

where  $r$  is the radius of the circle

Compute the Area of the circle with the following radius.

a.  $r = 14 \text{ cm}$

$$A = \pi r^2$$

$$A = \pi(14\text{cm})^2$$

$$A = 196\pi$$

$$A = 615.75 \text{ cm}^2$$

b.  $r = 9 \text{ cm}$

$$A = \pi r^2$$

$$A = \pi(9\text{cm})^2$$

$$A = 81\pi$$

$$A = 254.47 \text{ cm}^2$$

c.  $r = 3.4 \text{ cm}$

$$A = \pi r^2$$

$$A = \pi(3.4\text{cm})^2$$

$$A = 11.56\pi$$

$$A = 36.32 \text{ cm}^2$$



# TABLE OF ACTIVITIES

Ages 11-12 (Basic)		G7
1	New Year's Attire	
2	New Year's Decors	
3	New Year's Eve Family Dinner	
4	Fireworks	
5	Polka Dots	
Ages 12-13 (Advanced)		G8
6	New Year's Gift	
7	Street's Ring Lights	
8	New Year's Scavenger Hunt	
9	New Year's Resolution	
10	January 1	



# NEW YEAR'S ATTIRE

G7  
Basic

It's almost new year! Anne is preparing for their family's New Year's Eve party and thinking of what she will be wearing while justifying the answers below. Help her!

1. A circle is a set of all points equidistant to a fixed point called the center.

2. The area of a circle can be found using the diameter.

3. The area of a circle is twice the product of  $\pi$  and  $r$ .

4. Given the circle with a radius of 7 inches, its area to the nearest tenth is 98 square inches.

5. If the diameter of a circle is 15 cm, then the circumference is  $15\pi$ .



# NEW YEAR'S DECORS

G7  
Basic

Your mother asked you to help her decor your house for the New Year's Eve party. She asked you to cut circles. Draw the circles with the measurements below and cut it.

1.) radius = 2 cm



2.) diameter = 5.5 cm

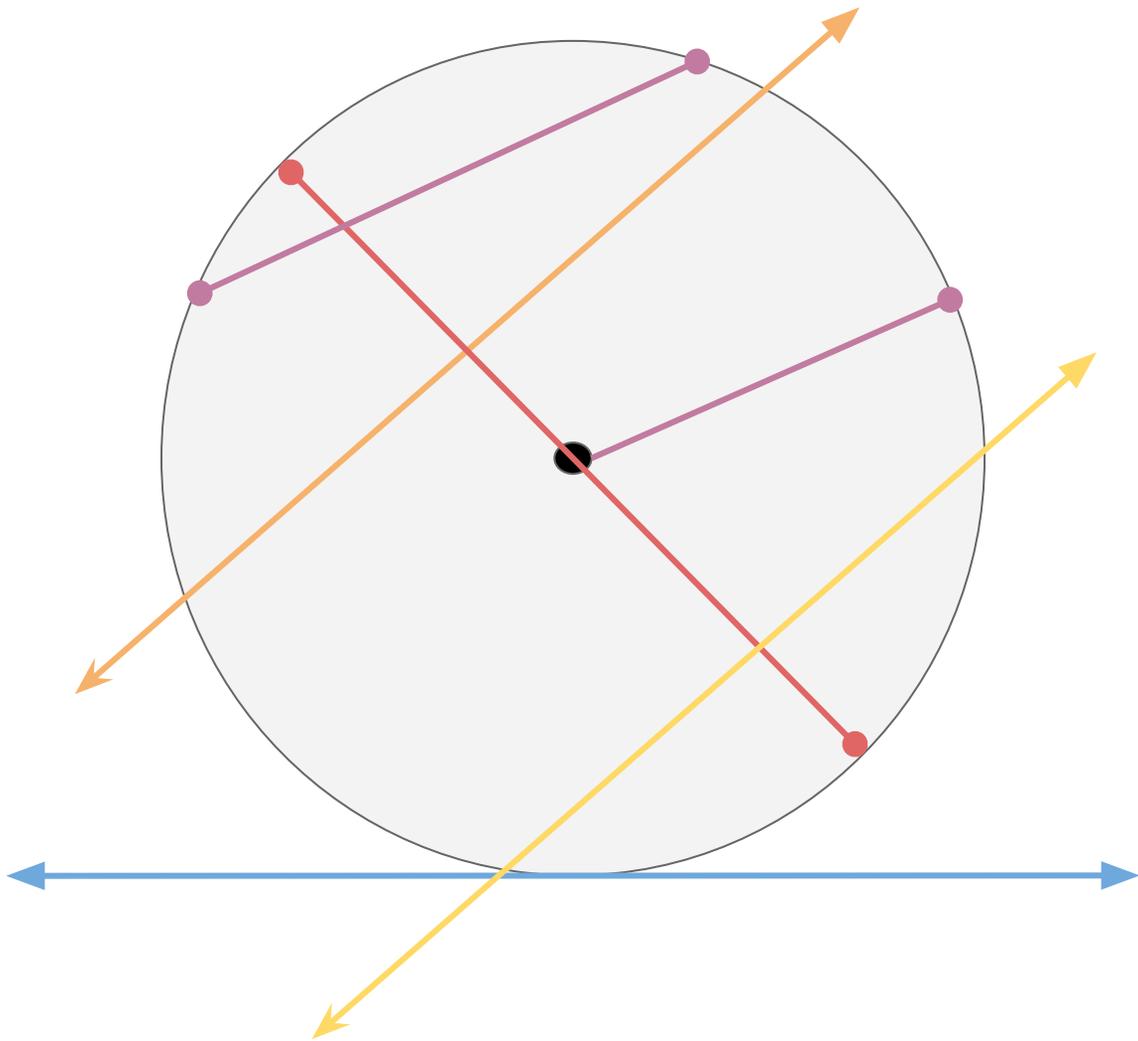
3.) radius = 0.75 in



# NEW YEAR'S EVE FAMILY DINNER

G7  
Basic

It's almost dinner time! While waiting for other family members to come, Anne answers the activity below. Help her identify the parts of the circle.



# FIREWORKS

G7  
Basic

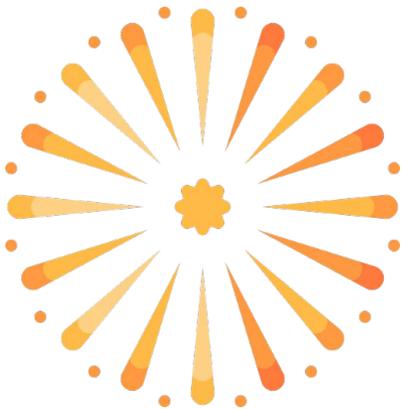
Enjoy watching the fireworks while solving for the diameter of the circle given the radius. Then, draw a circular fireworks using the measurement.

1.)  $r = 8 \text{ mm}$        $d = \underline{\hspace{2cm}}$

2.)  $r = 2.5 \text{ cm}$        $d = \underline{\hspace{2cm}}$

3.)  $r = 1 \text{ in}$        $d = \underline{\hspace{2cm}}$

4.)  $r = 16.28 \text{ cm}$        $d = \underline{\hspace{2cm}}$



5.)  $r = 3.91 \text{ in}$        $d = \underline{\hspace{2cm}}$



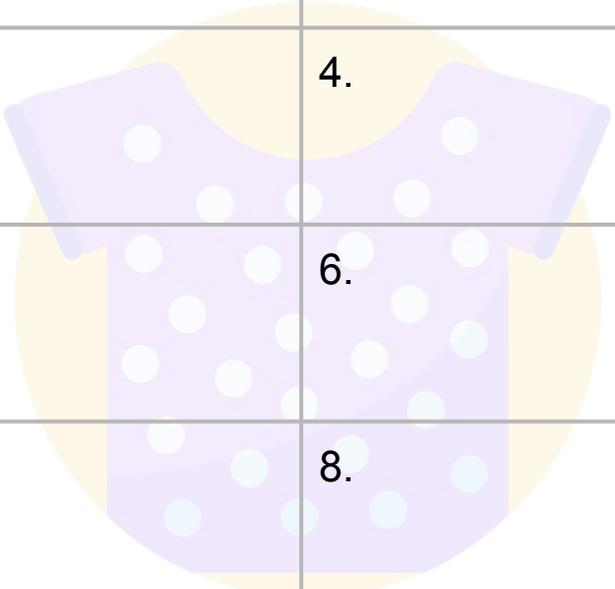
# POLKA DOTS

G7  
Basic

Your family's new year's outfit theme is polka dots. You see different sizes of circles on your cousin's shirt, and you measured the diameter (in cm) of each, then what is the corresponding radius of each circle? Find it out.

1. diameter = 4
2. diameter = 13
3. diameter = 2.6
4. diameter = 5.1
5. diameter = 7
6. diameter = 1.2
7. diameter = 6.4
8. diameter = 3.8

1.	2.
3.	4.
5.	6.
7.	8.



# NEW YEAR'S GIFT

G8  
Advanced

Receive your new year's gift by giving the circumference of the circle given the measurements. Give your answer in terms of  $\pi$ .

1. radius = 8 m
2. radius = 13 cm
3. radius = 0.7 mi
4. diameter = 4.6 km
5. diameter = 17.5 yd
6. diameter = 183.6 in



Space for solution:

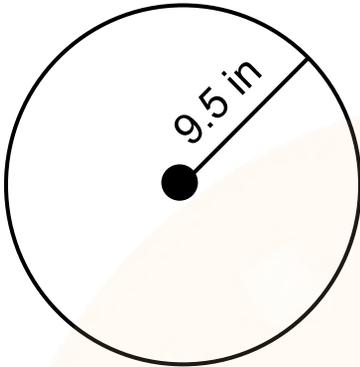


# STREET'S RING LIGHTS

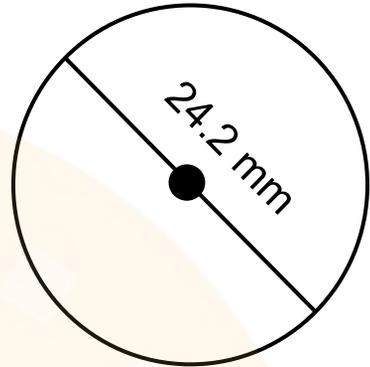
G8  
Advanced

During new year's season, ring lights are on the streets. The measurements of the ring lights are given below. Find each circumference and round off your answer to the nearest tenth.

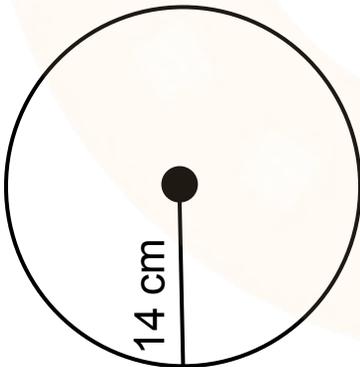
1.)



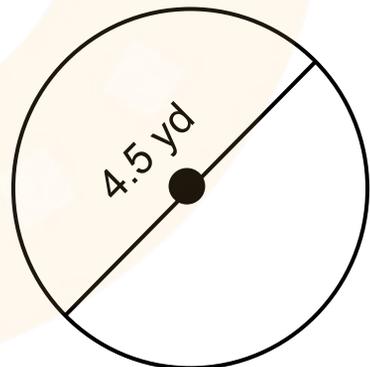
2.)



3.)



4.)

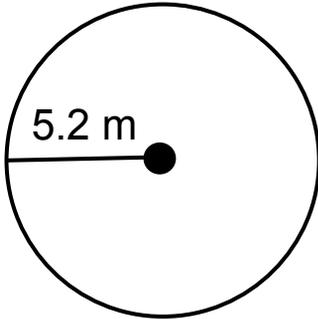


# NEW YEAR'S SCAVENGER HUNT

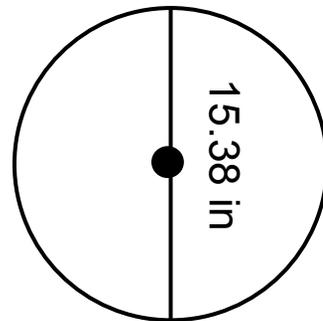
G8  
Advanced

It's nice to play games with the family. Find the items below and answer the questions by getting the area of the circle given the radius or diameter. Round off your answer to the nearest tenths.

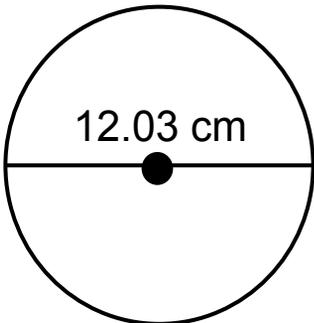
1.)



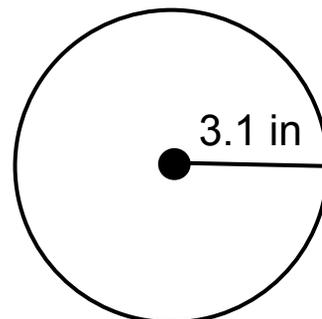
2.)



3.)



4.)



# NEW YEAR'S RESOLUTION

G8  
Advanced

While preparing to sleep, Anne wants to share her new year's resolution with her mother but before that she needs to answer first the questions below.

Is circle a polygon? Why or why not?

What are the lines/segments which can be found in a circle?



Enjoy the first day of the year by answering the questions below.  
Find the area of the circle given the measurements in terms of  $\pi$ .

1.) radius = 2.5 in

2.) radius = 8.15 cm

3.) diameter = 9.2 mm

4.) diameter = 25.1 cm



5.) radius = 15 in

6.) diameter = 38 yd

HAPPY NEW YEAR



# ANSWER GUIDE

## Activity 1

- |           |          |                   |
|-----------|----------|-------------------|
| 1.) True  | 2.) True | 3.) circumference |
| 4.) 153.9 | 5.) 30   |                   |

## Activity 2

The circles must have the exact measurement.

## Activity 3

- |                 |                 |
|-----------------|-----------------|
| Orange – secant | Purple - radius |
| Blue – tangent  | Red - diameter  |

## Activity 4

- 1.) 16 mm    2.) 5 cm    3.) 2 in    4.) 32.56 cm    5.) 7.82 in
- \*with corresponding drawing

## Activity 5

- |         |         |         |          |
|---------|---------|---------|----------|
| 1.) 2   | 2.) 6.5 | 3.) 1.3 | 4.) 2.55 |
| 5.) 3.5 | 6.) 0.6 | 7.) 3.2 | 8.) 1.9  |



# ANSWER GUIDE

## Activity 6

- |                 |                  |                   |
|-----------------|------------------|-------------------|
| 1.) $16\pi$ m   | 2.) $26\pi$ cm   | 3.) $0.14\pi$ mi  |
| 4.) $4.6\pi$ km | 5.) $17.5\pi$ yd | 6.) $183.6\pi$ in |

## Activity 7

- |             |           |           |             |
|-------------|-----------|-----------|-------------|
| 1.) 59.7 in | 2.) 76 mm | 3.) 88 cm | 4.) 14.1 yd |
|-------------|-----------|-----------|-------------|

## Activity 8

- |                        |                          |                          |                         |
|------------------------|--------------------------|--------------------------|-------------------------|
| 1.) $84.9 \text{ m}^2$ | 2.) $185.8 \text{ in}^2$ | 3.) $113.7 \text{ cm}^2$ | 4.) $30.2 \text{ in}^2$ |
|------------------------|--------------------------|--------------------------|-------------------------|

## Activity 9

1. A circle is not a polygon because it does not have any side or corner. Polygon is defined as a plane figure that is described by a finite number of straight-line segments connected to form a closed polygonal chain. A circle does not have any straight line segment. Thus, it is not a polygon.

2. These lines/segments are radius, diameter, chord, secant, and tangent.

## Activity 10

- |                                |                               |                             |
|--------------------------------|-------------------------------|-----------------------------|
| 1.) $6.25\pi \text{ in}^2$     | 2.) $66.4225\pi \text{ cm}^2$ | 3.) $21.16\pi \text{ mm}^2$ |
| 4.) $157.5025\pi \text{ cm}^2$ | 5.) $225\pi \text{ in}^2$     | 6.) $361\pi \text{ yd}^2$   |



# Copyright Notice

This resource is licensed under the [Creative Commons Attribution-NonCommercial 4.0](https://creativecommons.org/licenses/by-nc/4.0/) International license.

You are free to:

- **Share** – copy and redistribute the material in any medium or format
- **Adapt** – remix, transform, and build upon the material

Under the following terms:

- **Attribution** – You must give appropriate credit, provide a link to the license, and indicate if changes were made. You may do so in any reasonable manner, but not in any way that suggests the licensor endorses you or your use.
- **NonCommercial** – You may not use the material for commercial purposes.

For more information on this license, visit the following link:

<http://creativecommons.org/licenses/by-nc/4.0/>

Where possible, free-use images are sourced from online repositories such as Wikipedia and Wikimedia Commons. References and sources for images are provided in the speaker notes section of this document.

Thank you!



# Thank you

Thank you so much for purchasing and downloading this resource.

We hope it has been useful for you in the classroom and that your students enjoy the activities.

For more teaching and homeschooling resources like this, don't forget to [come back](#) and download the new material we add every week!

Thanks for supporting **Helping With Math**. We can provide teachers with low-cost, high-quality teaching and homeschooling resources because of our loyal subscribers and hope to serve you for many years to come.

- The Entire Helping With Math Team :)

