“Circle of Math”/Wheel of Fortune Instructions

…Before class…

Materials:

- “Circle of Math”/Wheel of Fortune board – included (may modify if desired), laminate if desired
- Thick cardboard or thick poster board (for “spinners”)
- Brass tacks/fasteners
- Problem set/questions for each category

Prep Work:

- Prepare board by drawing the “spinner”, cutting it out and fastening it to the center of the circle with a brass fastener.
- Figure out four or five problems/questions for each space of the wheel (32-40 total) that the students could *potentially* do in the session (in the event they land on a space multiple times).
- If desired, include solutions on a separate sheet (or back) for students to check their answers

…During class…

Method 1: Students versus Students

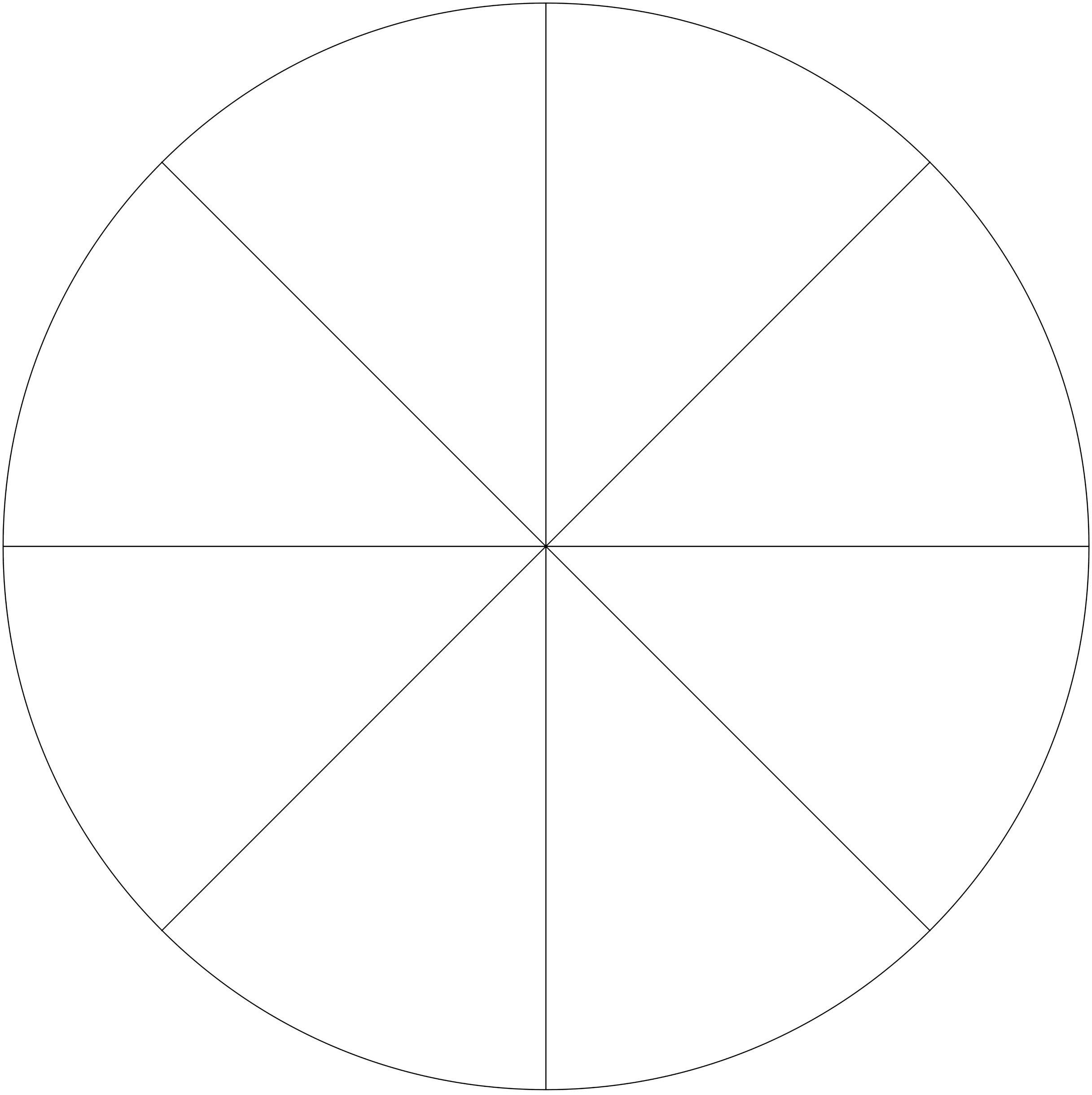
- Divide the class into one of the following groups of six in one of the following ways:
  - Two groups of three
  - Three groups of two
- Explain the following rules:
  - When it is your team’s turn, spin the arrow once and answer the first unanswered problem on your worksheet in that particular category
  - Work on the problem as a team and when you have reached your answer, check it with the answer on the other side/sheet.
    - If correct, your team receives the value of the space that you landed on.
    - If incorrect, the other team(s) may attempt the problem for half value (if they did not look at the solution. If more than two total teams, the first team to answer the problem correctly can take the points.
  - The opposing team(s) is (are) responsible for making sure the controlling team does not cheat by looking at the answer before attempting the problem
  - The winner will be determined either by the team with the most points at the end of the allotted time period or the first team to reach __________ points.
  - All winning teams will participate in the “Final Spin” where they will all compete on one final problem. The first team to have the correct solution will be crowned “Pi Royalty” (or something similar for non-Math disciplines).

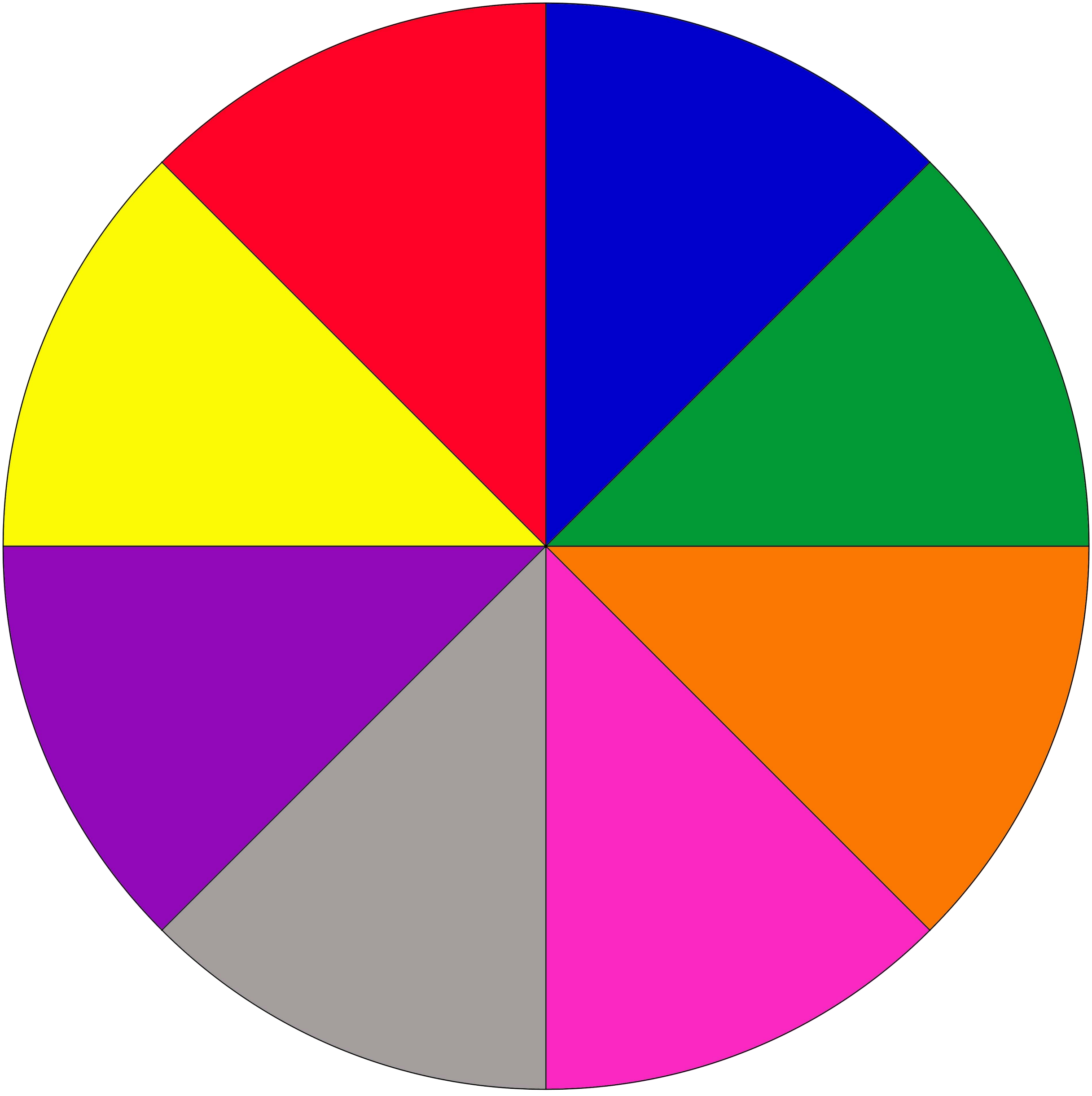
Method 2 is on the following page

Method 2: Students versus NPALM (=Nonexistent PAL Member)

- Divide the class into groups of three or four
- Explain the following rules:
  - Spin the arrow once and answer the first unanswered problem on your worksheet in that particular category
  - Work on the problem as a team and when you have reached your answer, check it with the answer on the other side/sheet.
    - If correct, your group receives the value of the space that you landed on.
    - If incorrect, award the points to the NPALM.
  - Play fairly and honestly by not looking at the answer before attempting the problem.
  - The winner will be determined either by the team with the most points at the end of the allotted time period or the first team to reach __________ points.
  - All winning teams will participate in the "Final Spin" where they will all compete on one final problem. The first team to have the correct solution will be crowned "Pi Royalty" (or something similar for non-Math disciplines).

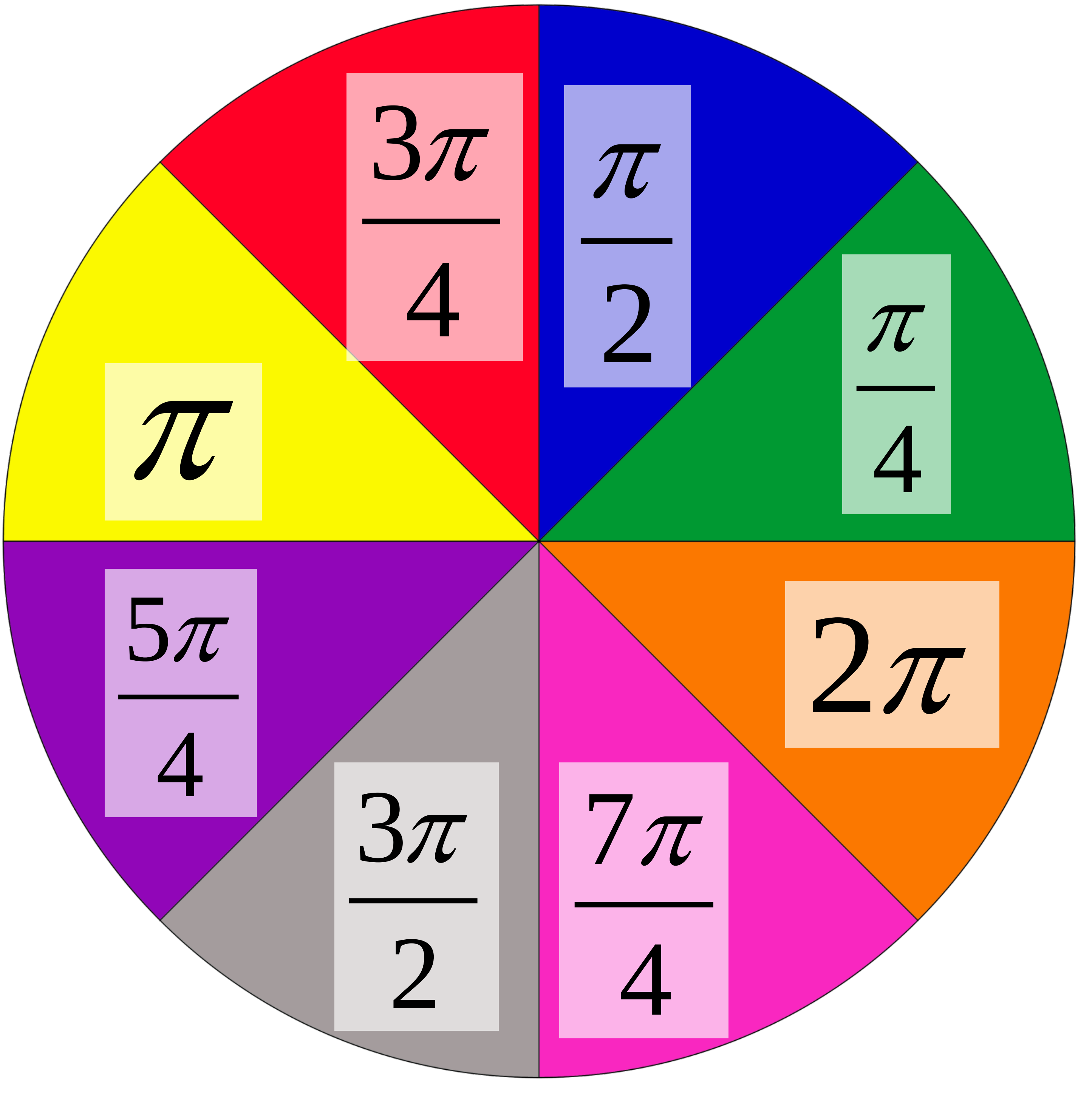
Attached is a copy of how I used the activity





$$(x-h)^2+(y-k)^2=r^2$$

OF MATH



$\frac{\pi}{4}$ - Grab Bag

1. Simplify

$$\frac{(x+3)5x^2 - x(15x+45)}{x^2-9}$$

2. Find the quotient and remainder of

$3x^5 - x^2 + x - 2$ divided by $3x^3 - 1$

3. Find all values of x: $\sqrt{12-x} = \left(2^{\frac{3}{2}}\right)x$

4. If a sphere has volume of $2304\pi\ in^3$, determine its surface area. (Leave in terms of π.)

5. How much water must be evaporated from 240 gallons of a 3% salt solution to produce a 5% salt solution?

$\frac{\pi}{2}$ – Section 1.1 & 1.2

Consider the function: $f(x) = -x^2 + 9$

1. What is the distance between $x = -5$ and $x = 2$?

2. What is the midpoint of the line connecting the points from the previous problem?

3. Identify the symmetry of $f(x)$.

4. List all intercepts of $f(x)$.

5. Is $(6, -28)$ a value on the graph of the function?

$\frac{3\pi}{4}$ - Section 1.3

Find the equation of the line in slope-intercept form. List x and y intercepts as well

1. slope=-2, contains $(3, -1)$

2. the line through $(-1,1)$ and $(3,3)$

3. parallel to $2x - 3y = -4$ contains$(-5,3)$

4. parallel to $x + y = 2$ contains $(1, -3)$

5. perpendicular to $3x - y = -4$, contains $(-2,4)$

π - Section 1.4

Find the standard form of the circle and graph:

1. $(h,k) = (-2,3), r = 4$

2. $x^2 + y^2 - 2x + 4y - 4 = 0$

3. $(h,k) = (3,4), (3,0)$ is on the circle

4. $3x^2 + 3y^2 - 6x + 12y = 0$

5. $(h,k) = (2,-4), (-1,-4)$ is on the circle

$\frac{5\pi}{4}$ –Section 2.1 &2.2

1. Is $y = \pm\sqrt{x}$ a function?

2. Find the domain of $h(x) = \sqrt{x}/|x|$

3. Find the difference quotient of $y = x^3$

4. Find $f(x) + g(x)$ if $f(x) = \frac{1}{x+2}, g(x) = \frac{3x}{x+3}$

5. List the domain of $f\big(g(x)\big)$

$\frac{3\pi}{2}$ - Section 2.3

1. Determine the parity* of $y = x^3 - 5x^2 + 2$

2. Find the average rate of change for

$g(x) = x^2 - 4$ from 2 to 6.

3. Determine the parity of $y = x^5 + 250x^3 - x^{101}$

4. On board: list the intervals where the graph is increasing

5. List all local minimum points of the graph.

$\frac{7\pi}{4}$- Section 2.5

List the transformation and graph for each:

1. $y = (x-5)^3 + 2$

2. $y = \sqrt{x+6}$

3. $y = 3|x+1| - 8$

4. $y = (x-2)^2 - 1$

5. $(y-1)^3 = x + 1$

2π – Section 2.6

1. An equilateral triangle is inscribed in a circle of radius r. Express the area within the circle, but outside the triangle as a function of the length of the triangle side, x.

2. If the radius of a sphere doubles, how does the volume and surface area change?

3. A circle of radius r is inscribed in a square. What is the area of the square in terms of r?

4. A right triangle has vertices at $(0,0), (0,y), (x,y)$ for the graph of $y = x^3$, $x > 0$. What is the area of the triangle in terms of x?

5. A rectangle has vertices in quadrant I on the graph of $y = 10 - x^2$, the origin, and each axis. Express the area of the rectangle in term of x.

*parity = even, odd, or neither function

Answers

$\frac{\pi}{4}$

1. $5x$
2. $x^2 + \frac{x-2}{3x^3-1}$
3. $x = \frac{1 \pm \sqrt{385}}{16}$
4. $SA = 576\pi\ in^2$
5. 96 gallons

$\frac{\pi}{2}$

1. $\sqrt{491}$
2. $\left(-\frac{3}{2}.-\frac{11}{2}\right)$
3. y axis symmetry
4. $(-3,0), (0,4), (3,0)$
5. No

$\frac{3\pi}{4}$

1. $y = -2x + 5, (0,5), (\frac{5}{2}, 0)$
2. $y = \frac{1}{2}x + \frac{3}{2}, \left(0, \frac{3}{2}\right), (-3,0)$
3. $y = \frac{2}{3}x + \frac{19}{3}$
4. $y = -x - 2$
5. $y = -\frac{1}{3}x + \frac{10}{3}$

π

1. $(x+2)^2 + (y-3)^2 = 16$
2. $(x-1)^2 + (y-2)^2 = 9$
3. $(x-3)^2 + (y-4)^2 = 16$
4. $(x-1)^2 + (y+2)^2 = 5$
5. $(x-2)^2 + (y+4)^2 = 9$

Answers

$\frac{5\pi}{4}$

1. No, it fails the vertical line test
2. Domain=all nonzero positive real numbers
3. $D.Q. = 3x^2 + 3xh + h^2$
4. $\frac{(3x^2+7x+3)}{(x+2)(x+3)}$
5. All reals except $x = -\frac{3}{5}$

$\frac{3\pi}{2}$

1. Neither
2. 8
3. Odd
4. $(-8,-2), (0,2), (5,\infty)$
5. $(-8,-4), (0,0), (5,0)$

$\frac{7\pi}{4}$

1. shift right 5, up 2, cubic graph
2. shift left 6, square root graph
3. shift left 1, down 8, 3 times narrower absolute value graph
4. right 2, down 1, upward parabola
5. solve for y; shift left 1, up 1, cubic graph rotated clockwise 90 degrees

2π

1. $\pi r^2 - \frac{1}{2}x(\frac{\sqrt{3}}{2}x)$
2. Volume increases by a factor of 8, Surface area increases by a factor of 4.
3. $A = 4r^2$
4. $A = \frac{1}{2}xy = \frac{x^4}{2}$
5. $A = xy = x(10 - x^2) = 10x - x^3$

*parity = even, odd, or neither function