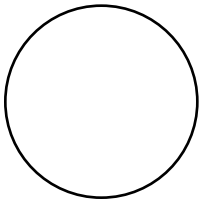
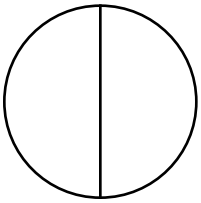
Appendix

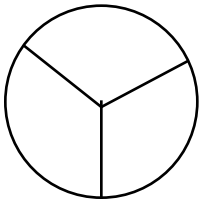
Pictures of the Fraction Circles



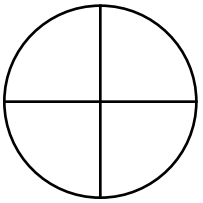
Black



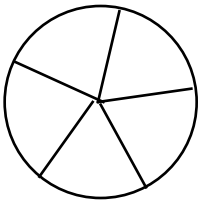
Yellow
2 pieces



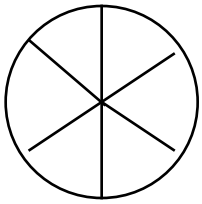
Brown
3 pieces



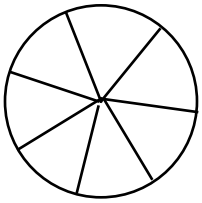
Blue
4 pieces



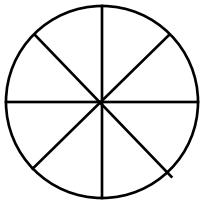
Orange
5 pieces



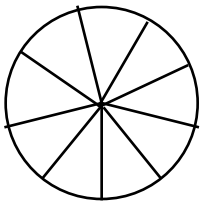
Pink
6 pieces



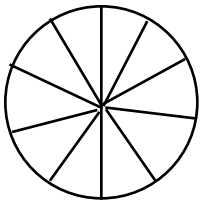
Light Blue
7 pieces



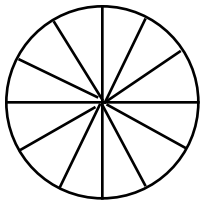
Gray
8 pieces



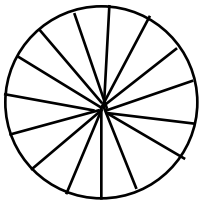
White
9 pieces



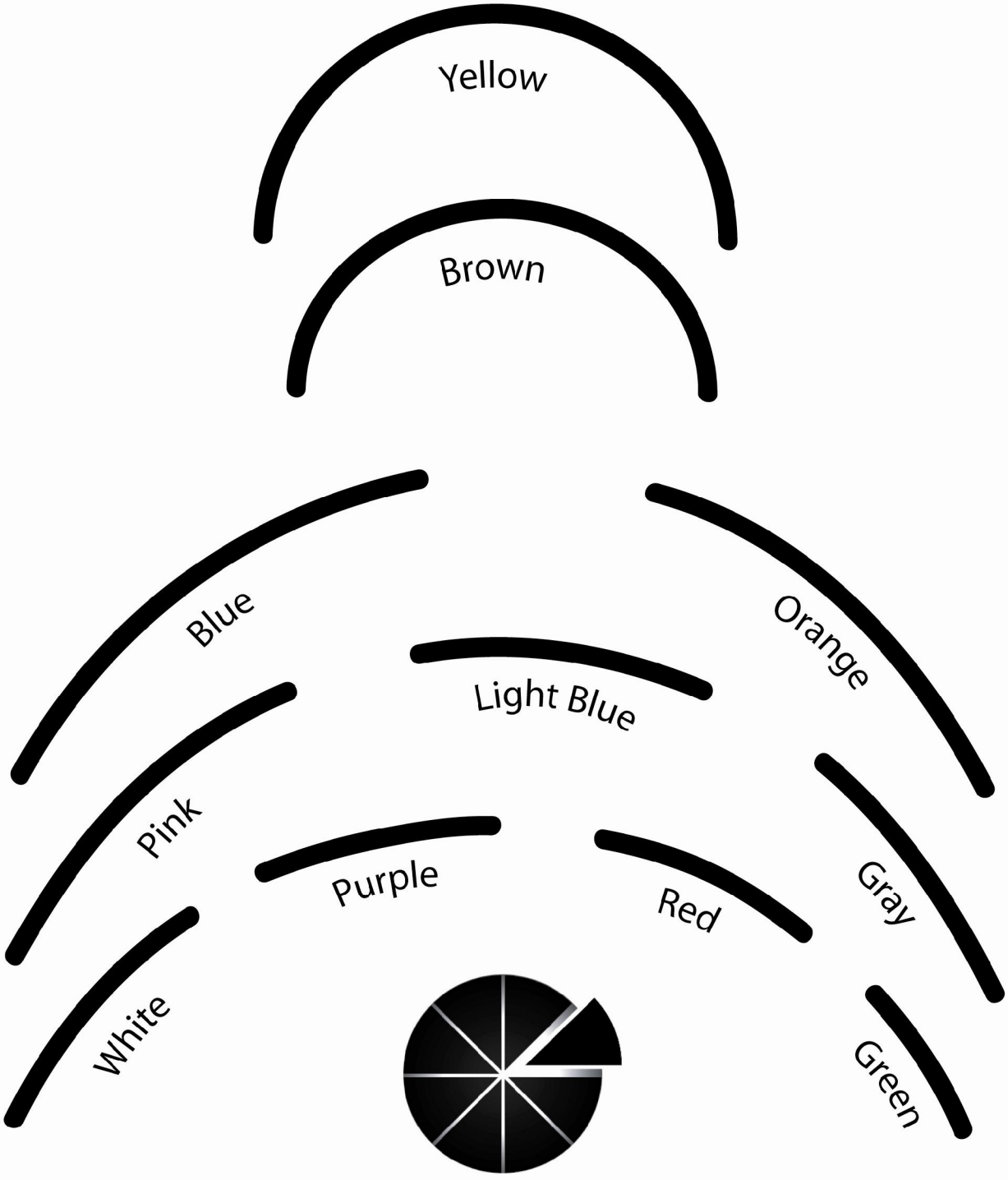
Purple
10 pieces



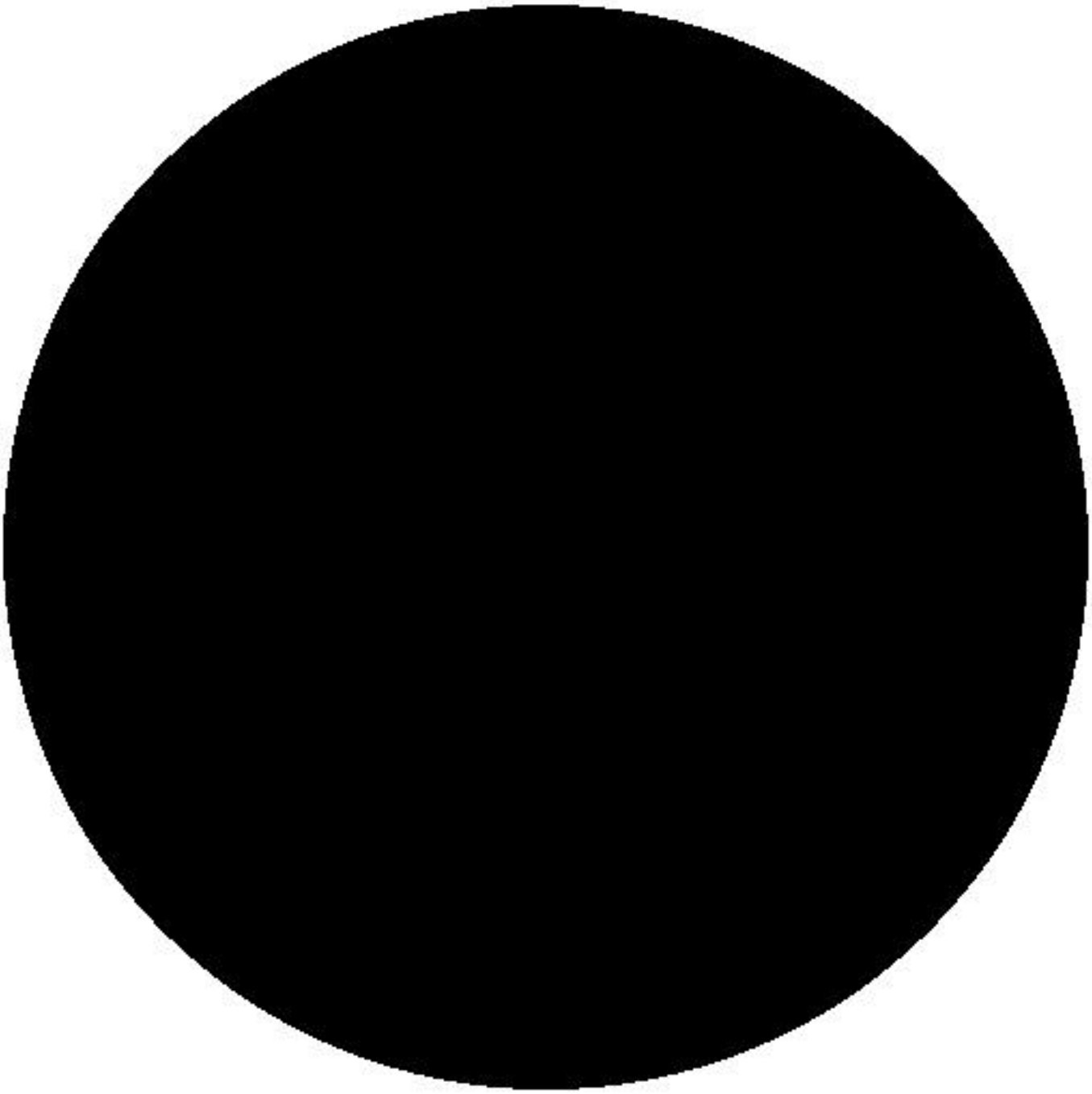
Red
12 pieces



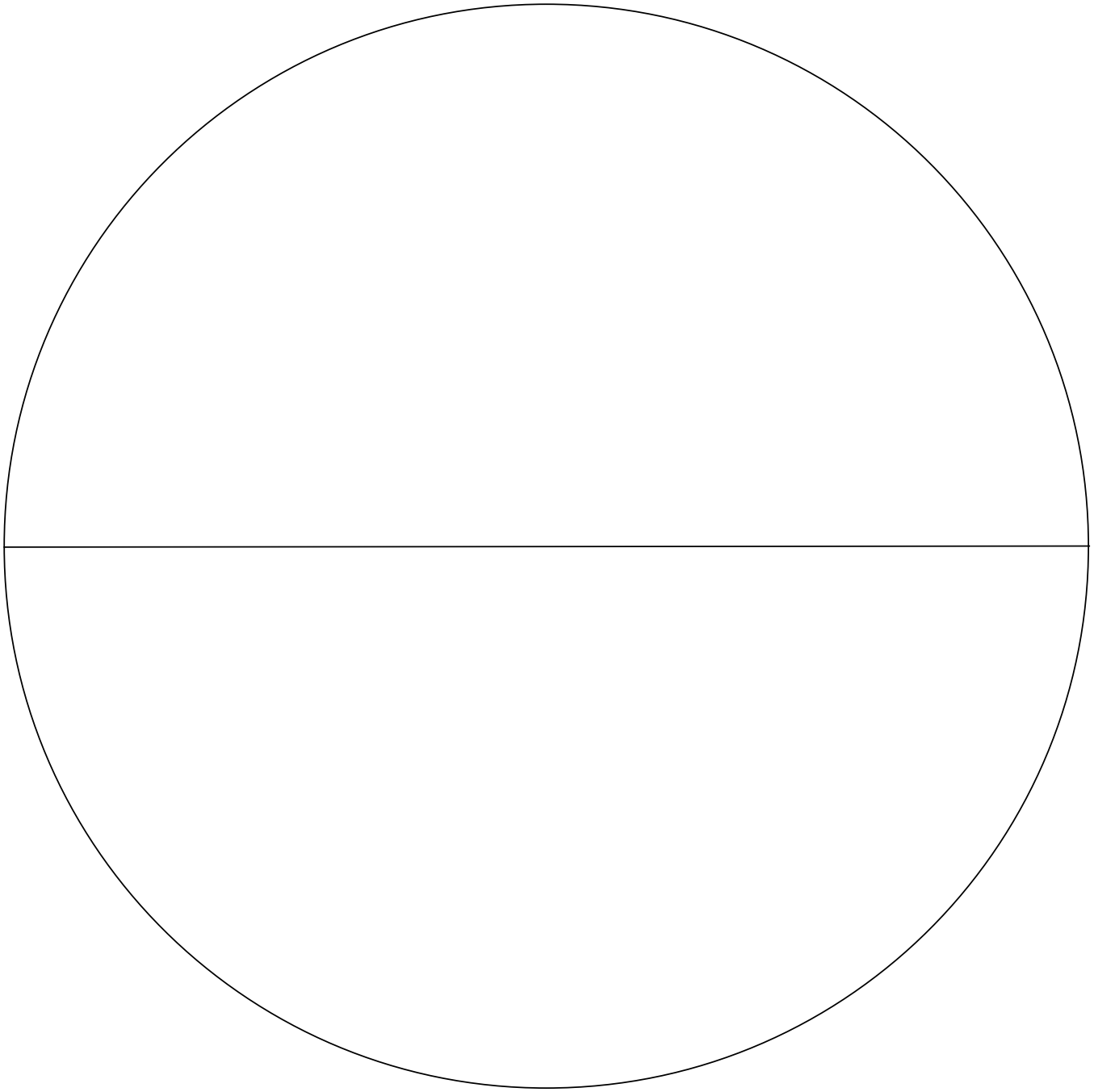
Green
15 pieces


Yellow
Brown
Blue
Orange
Light Blue
Pink
Purple
Red
Gray
White
Green

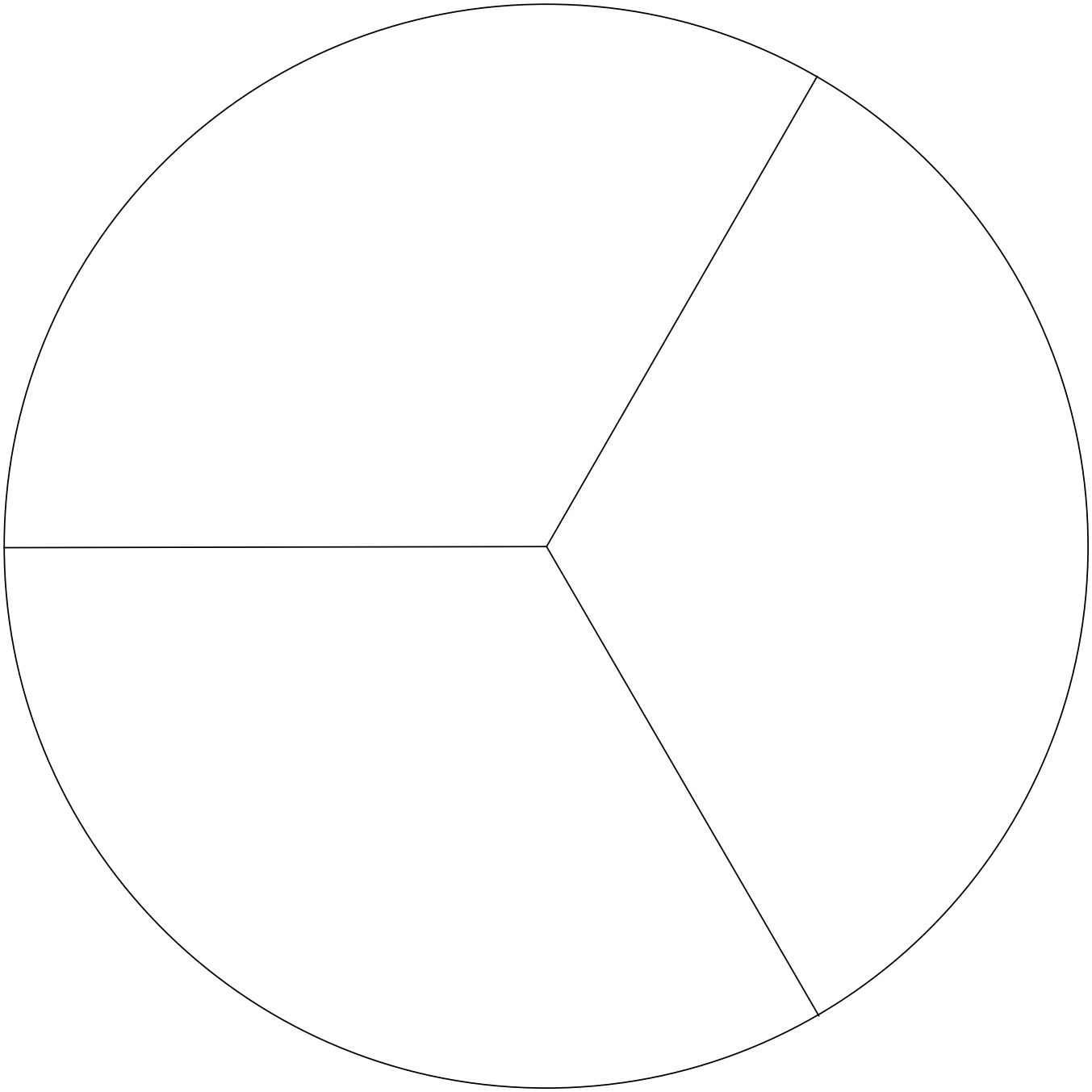
BLACK



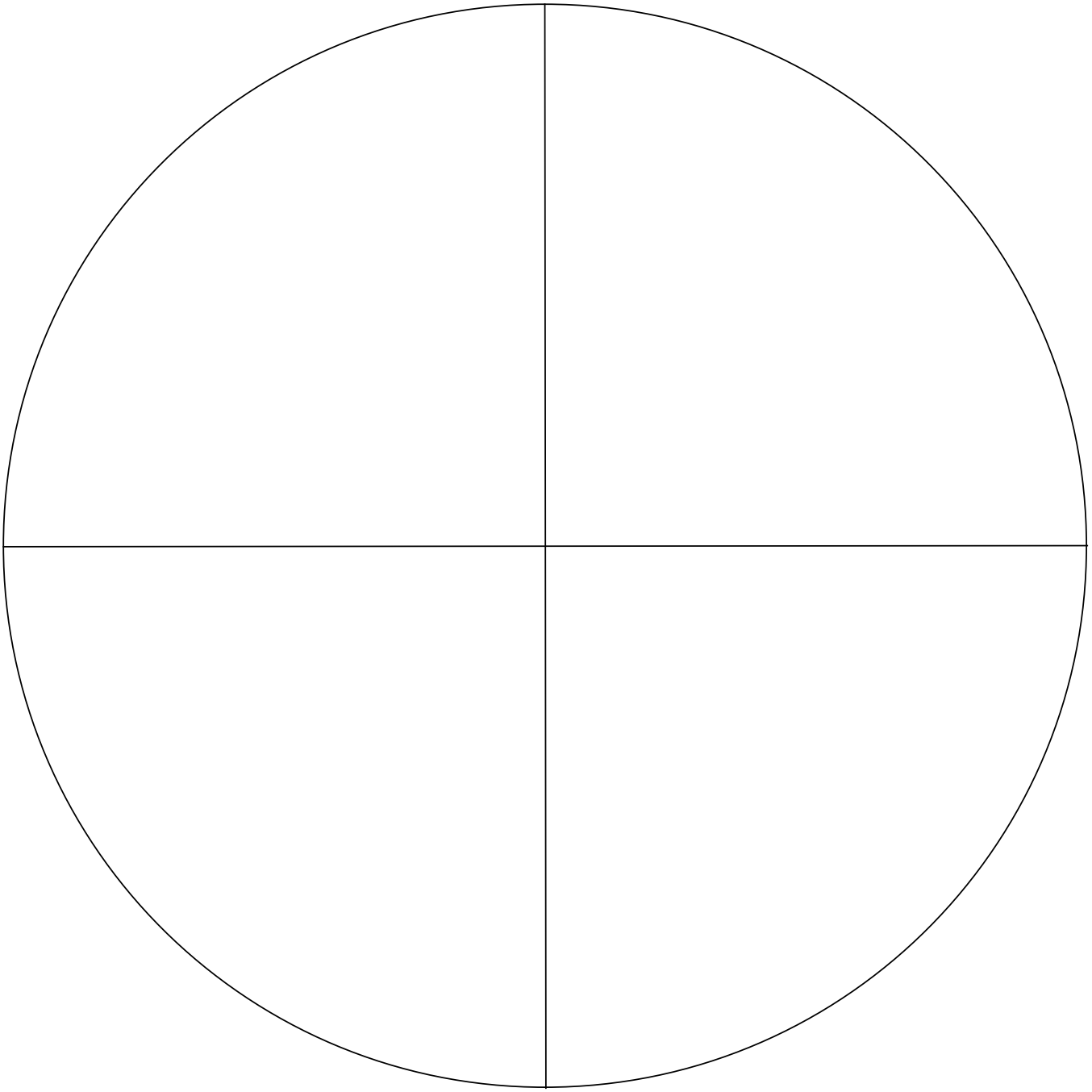
YELLOW



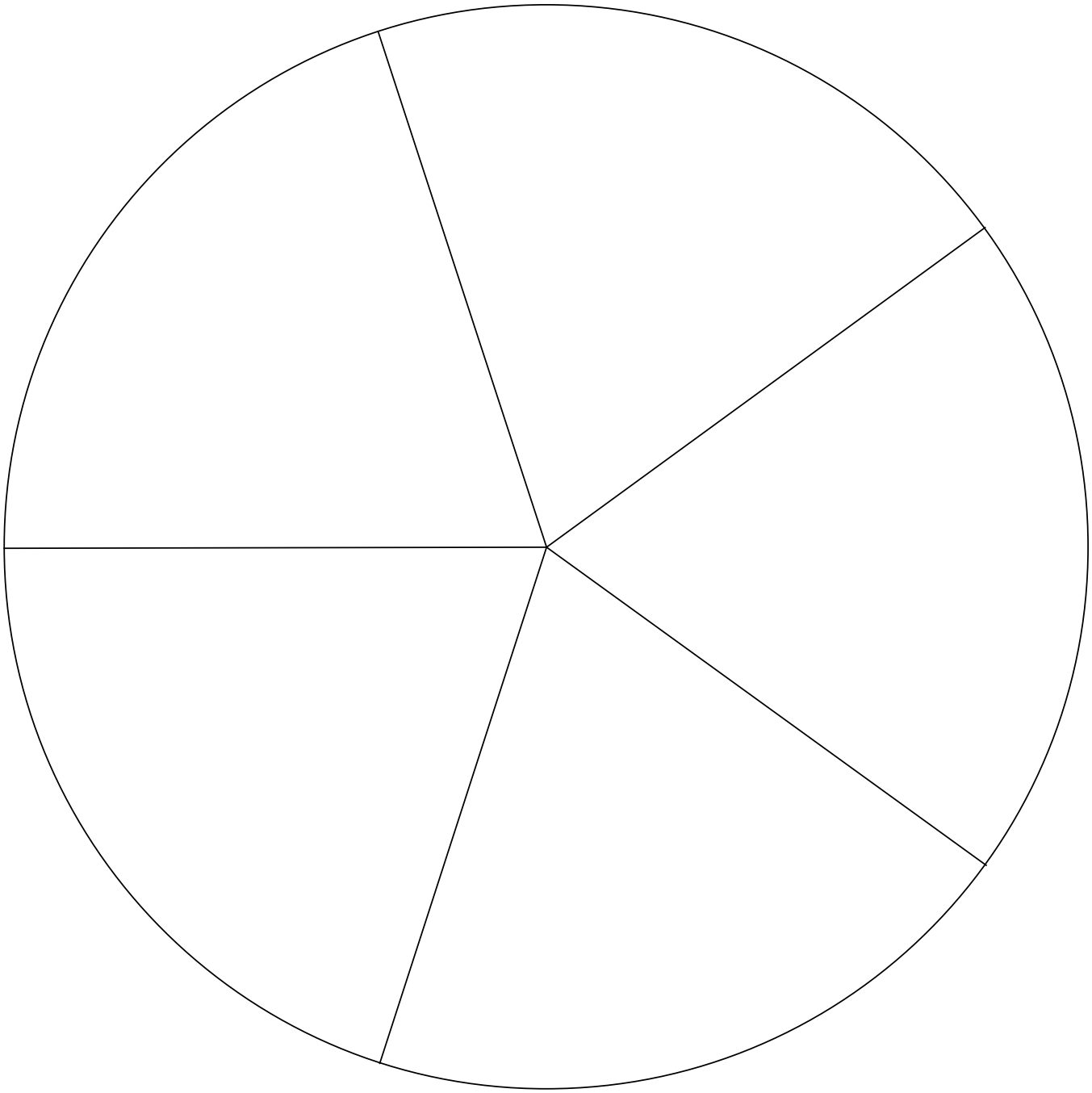
BROWN



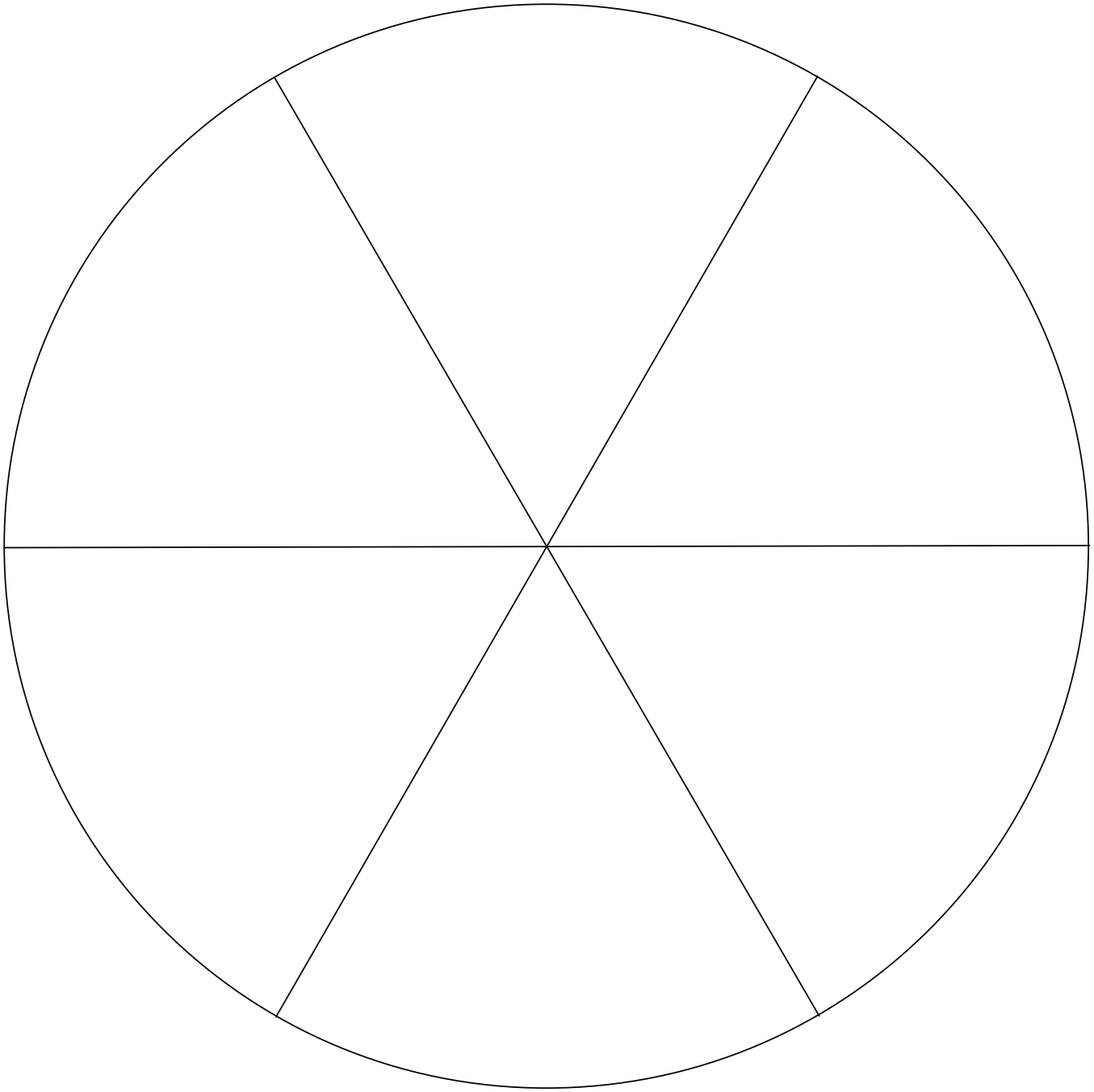
BLUE



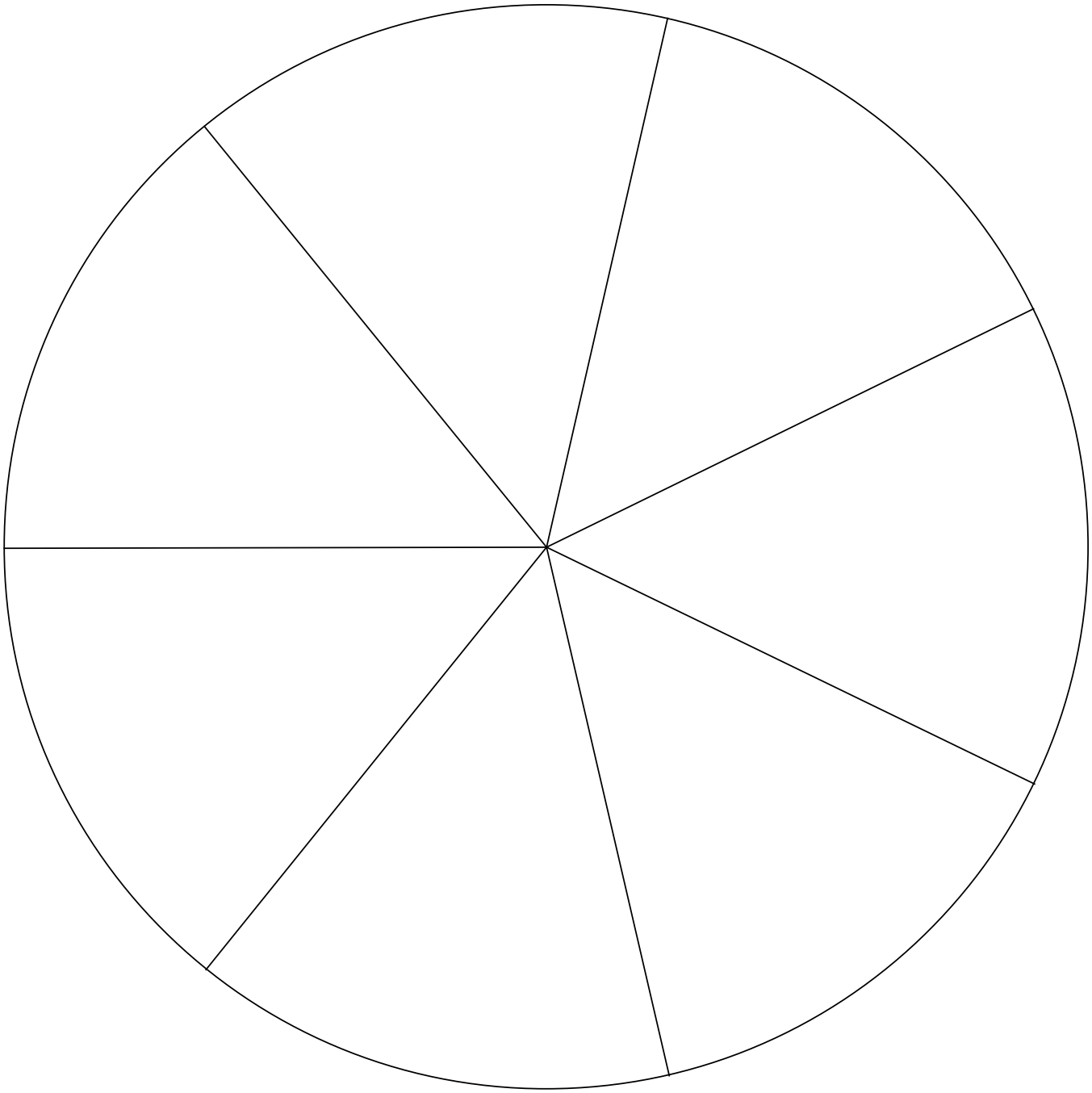
ORANGE



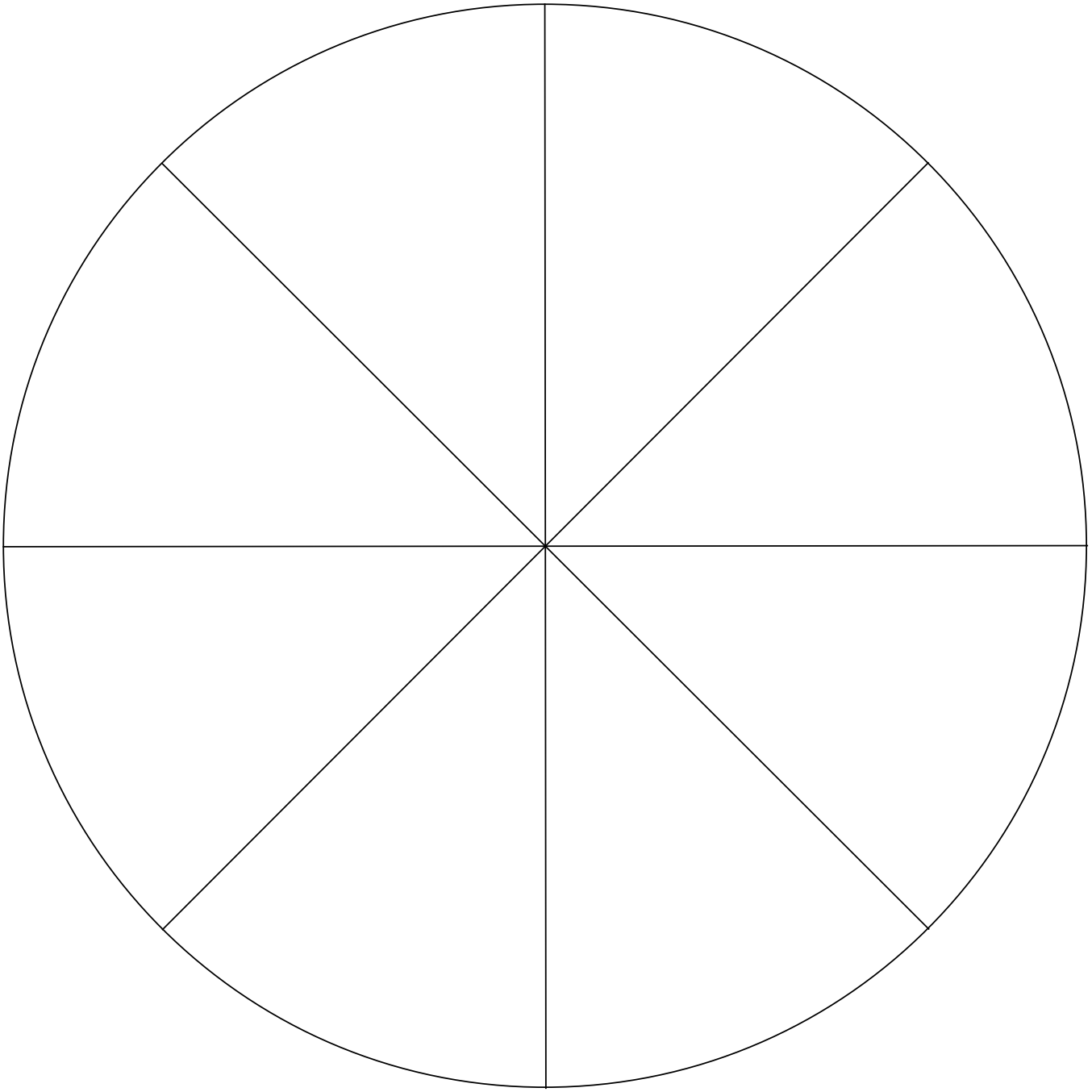
PINK



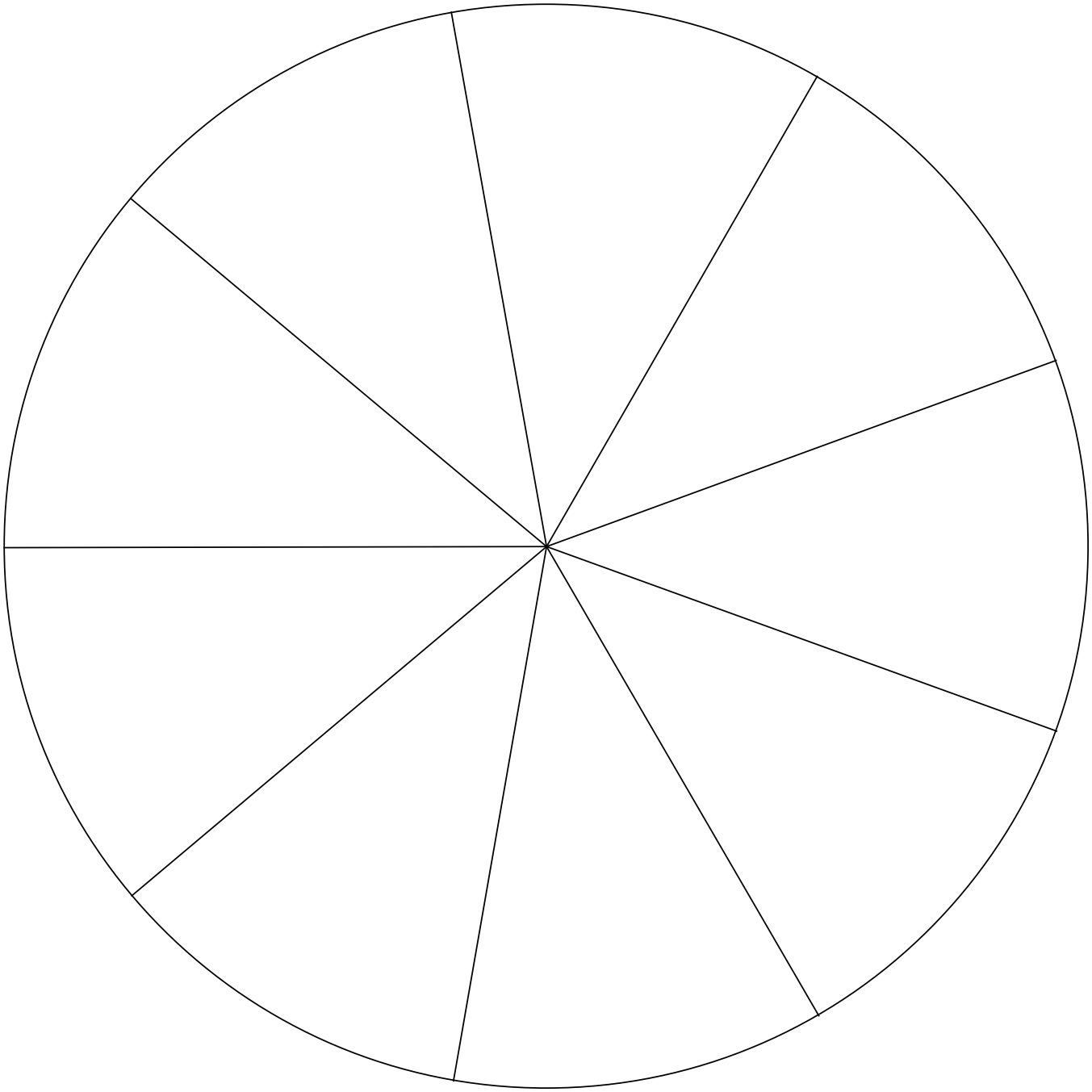
LIGHT BLUE



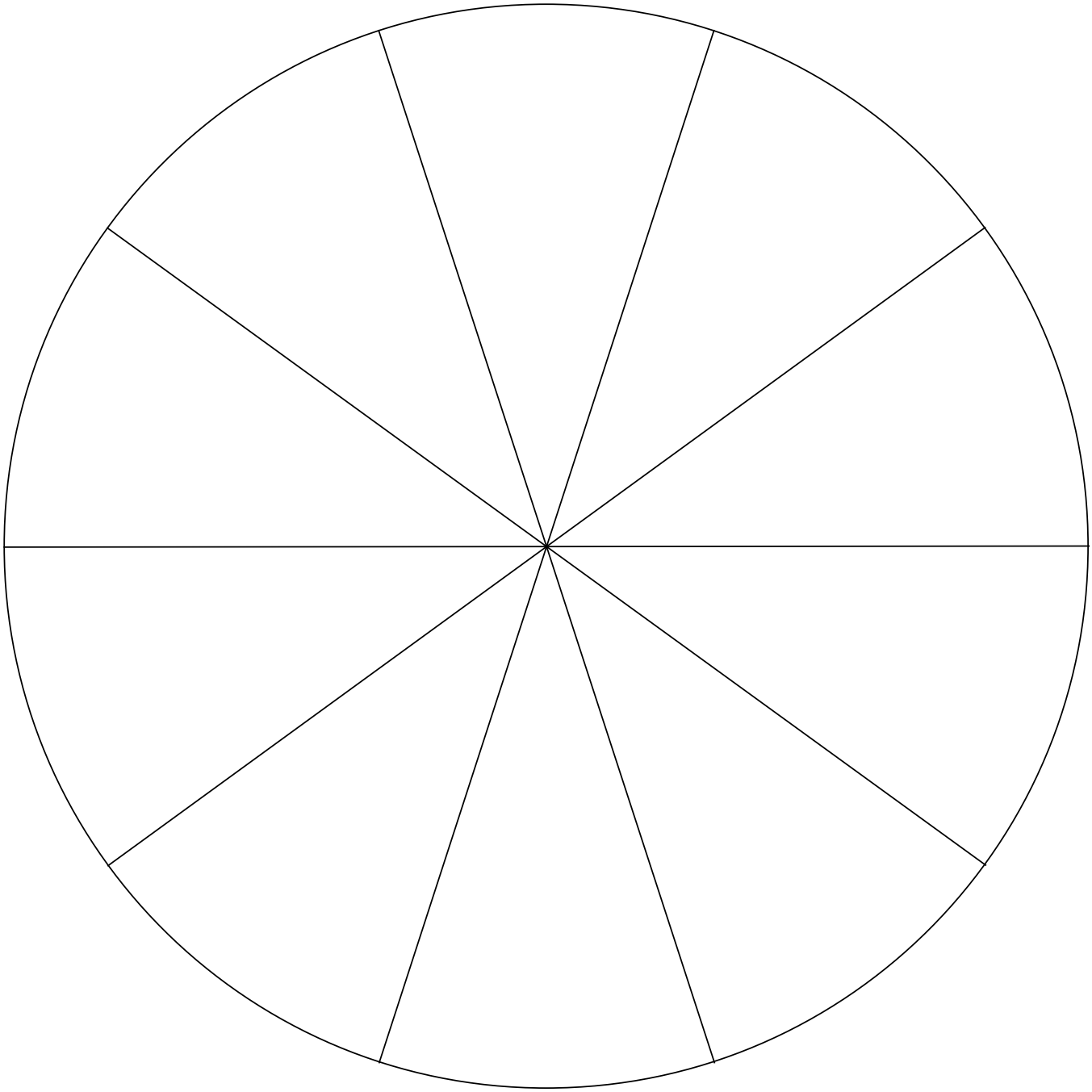
GRAY



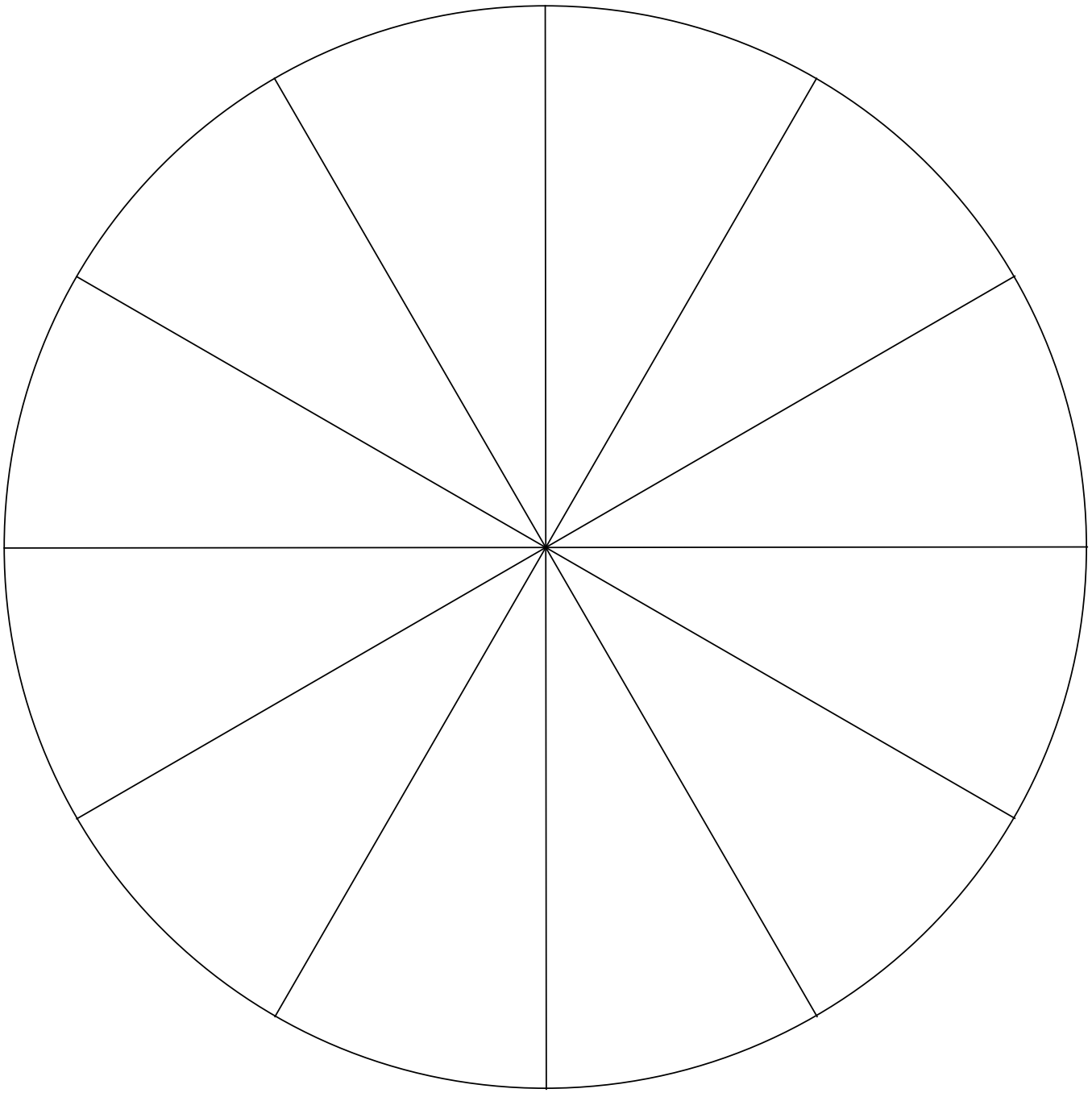
WHITE



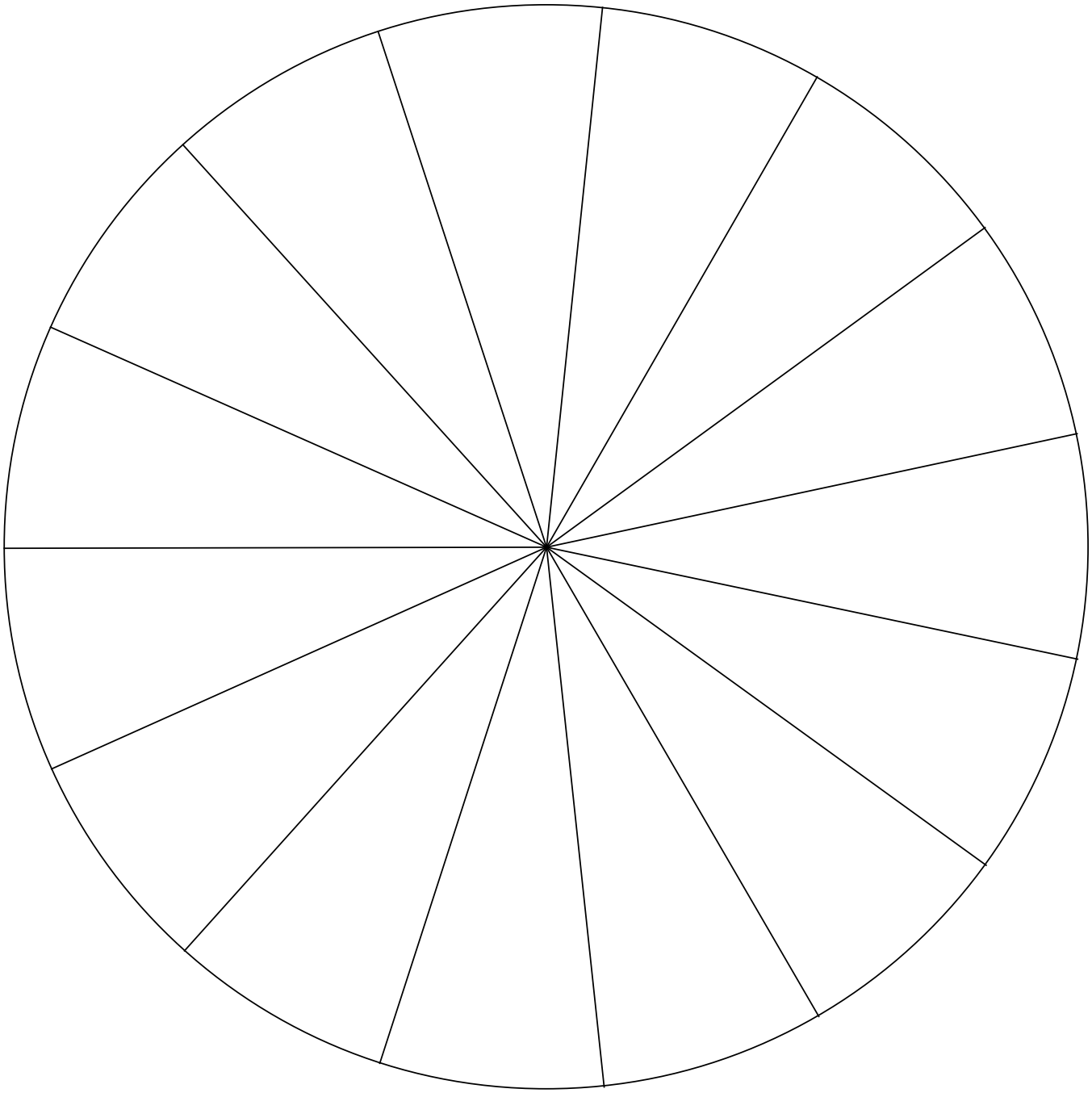
PURPLE



RED

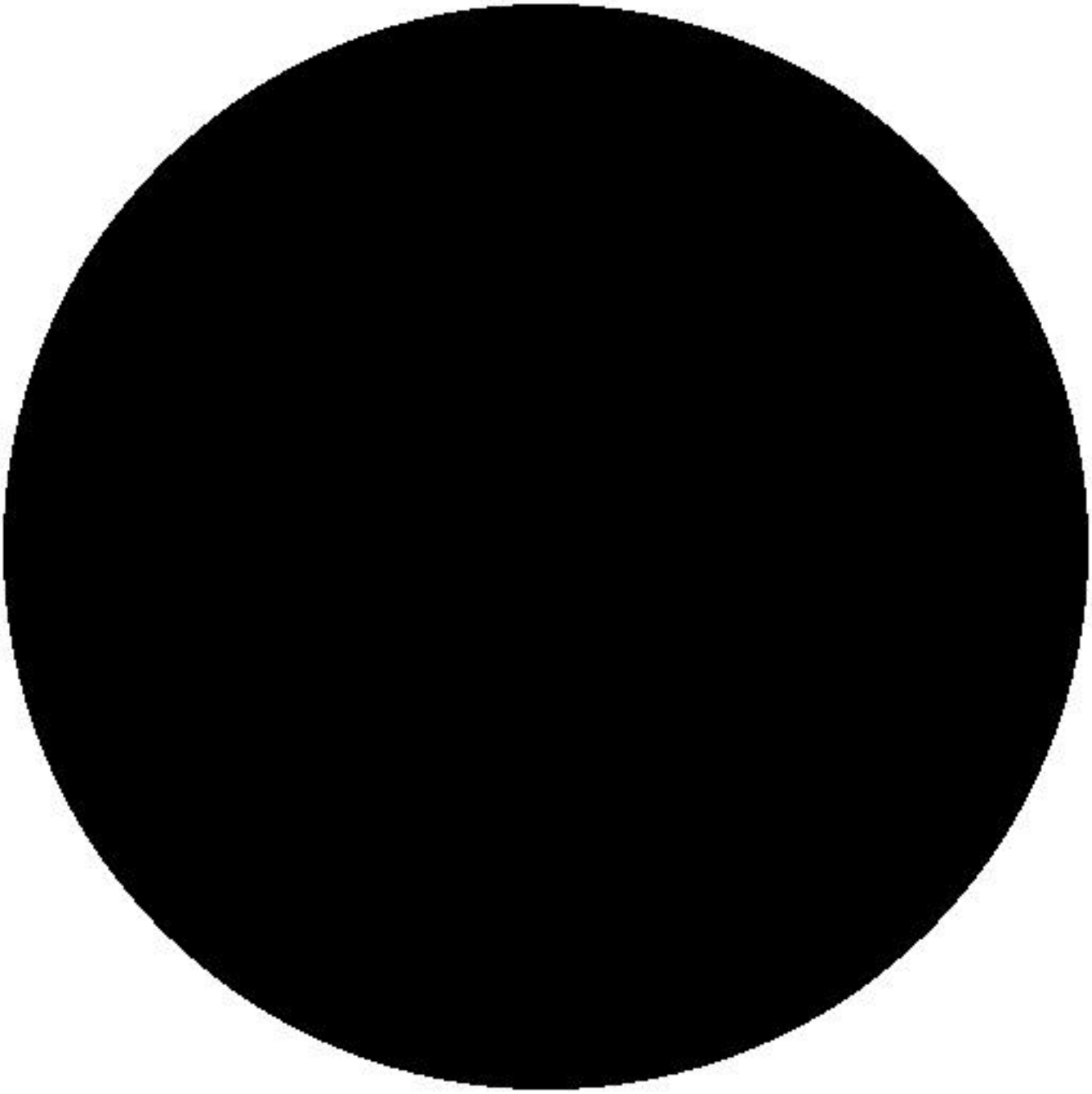


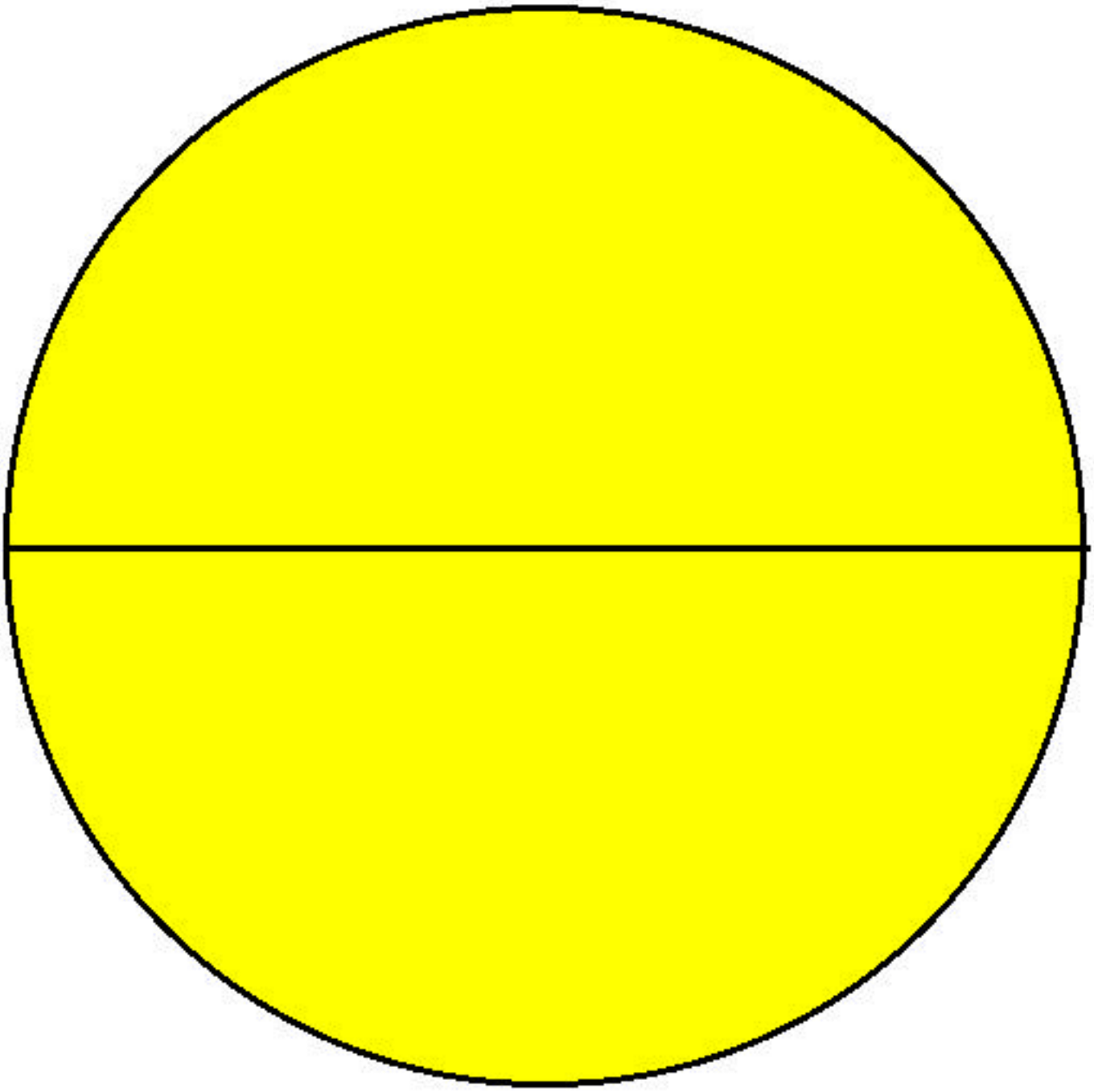
GREEN

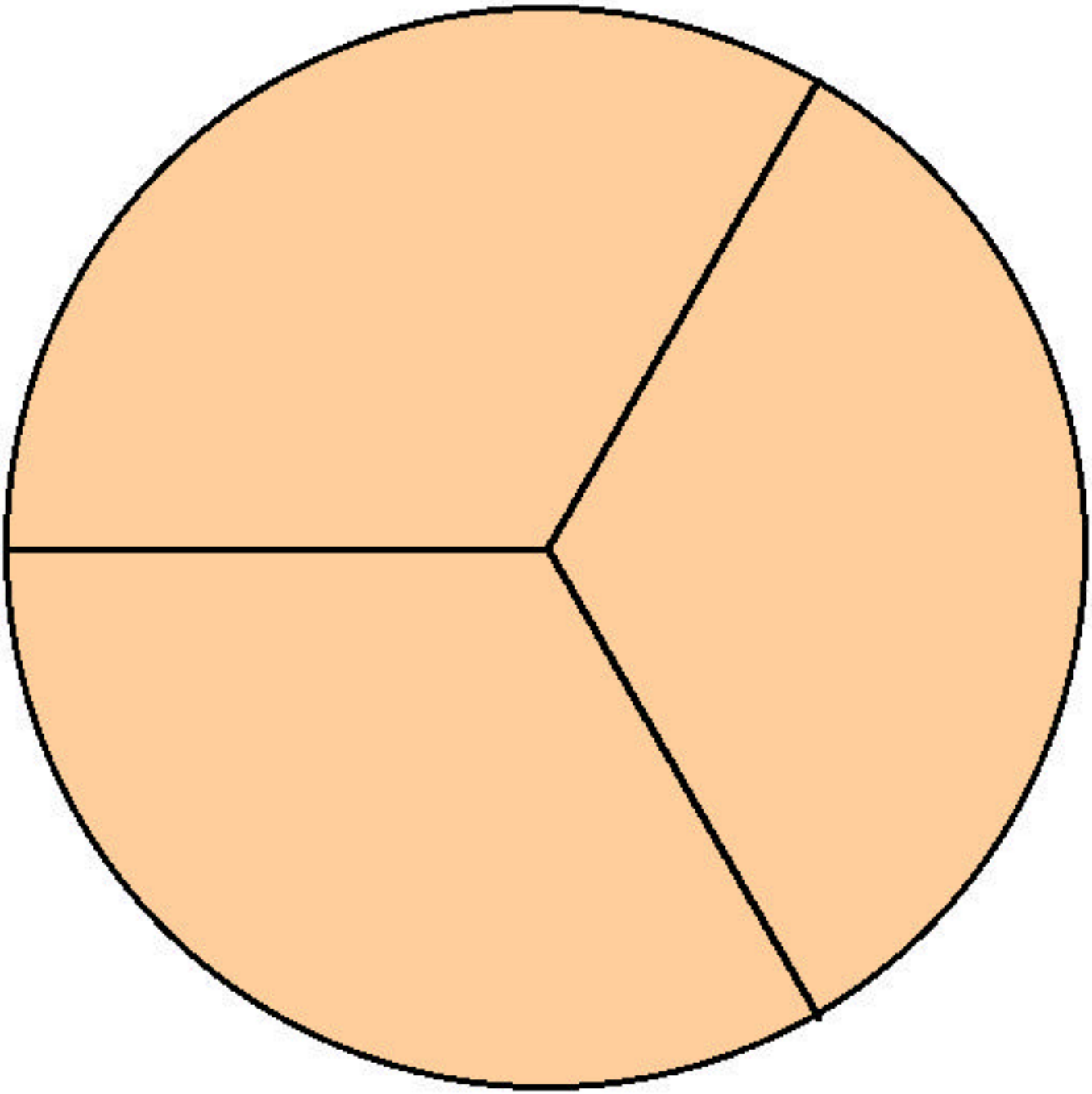


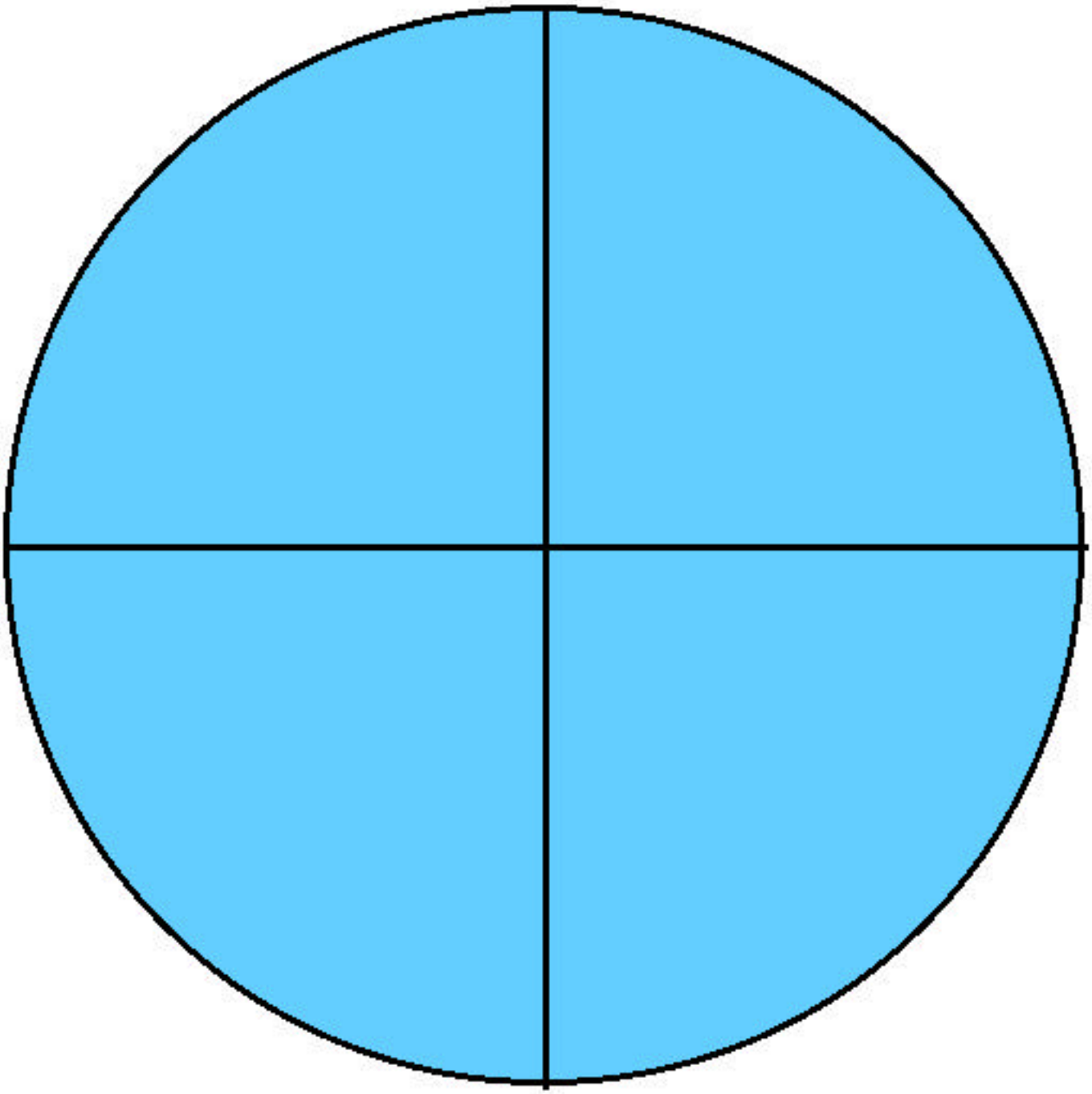
Fraction Circles
Colored Masters

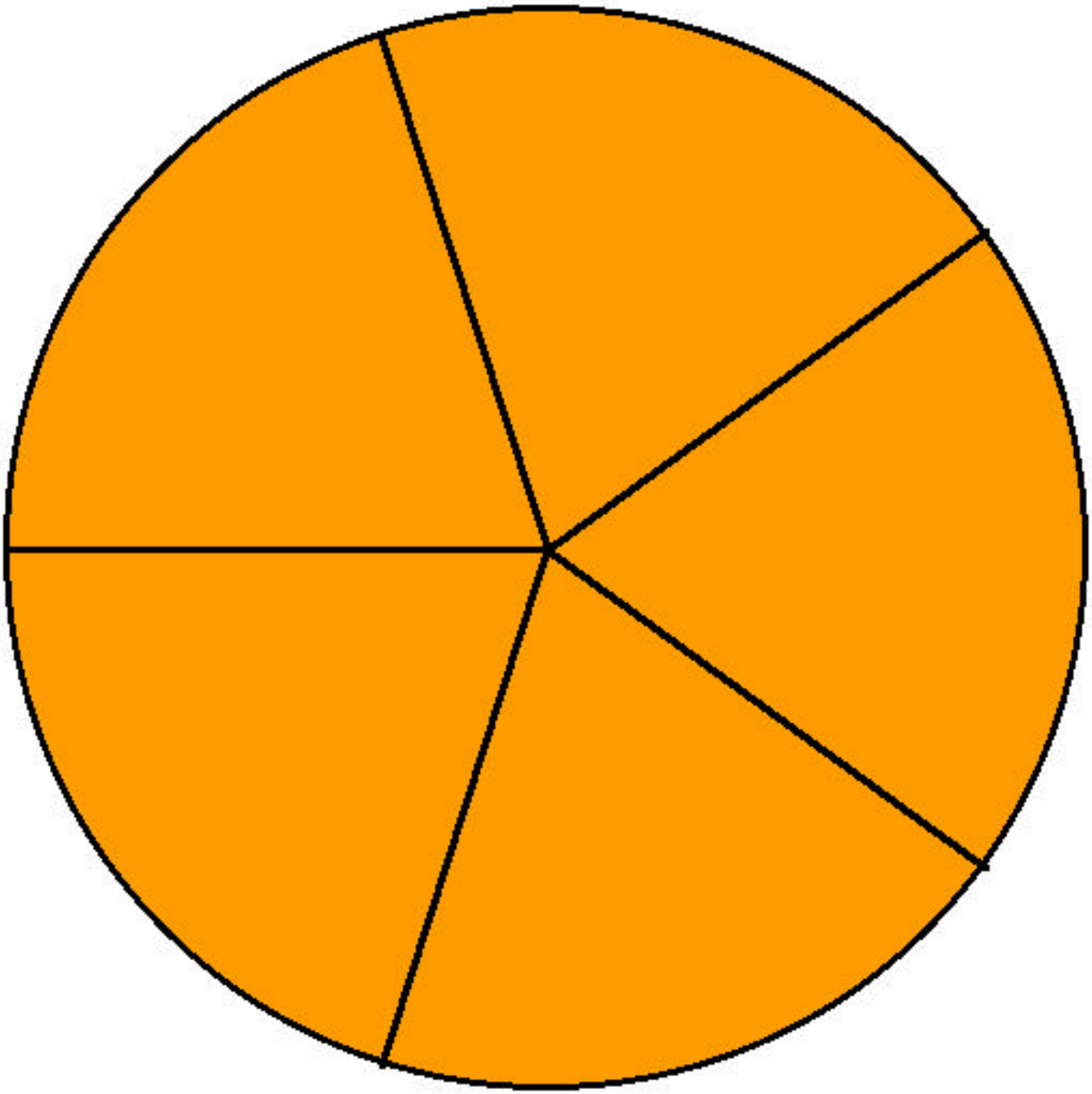
The following pages can be used to print
colored fraction circles on transparencies.

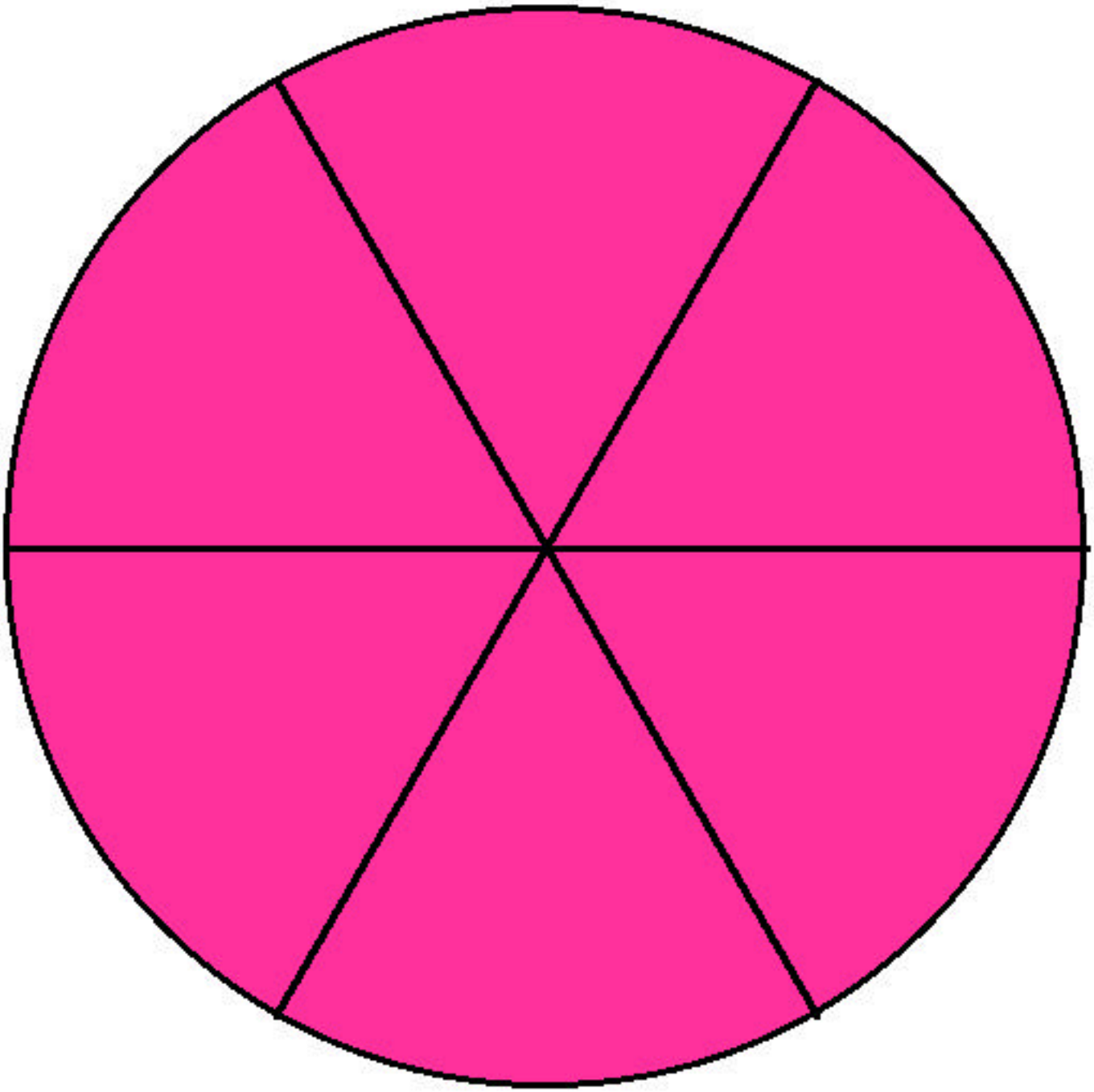


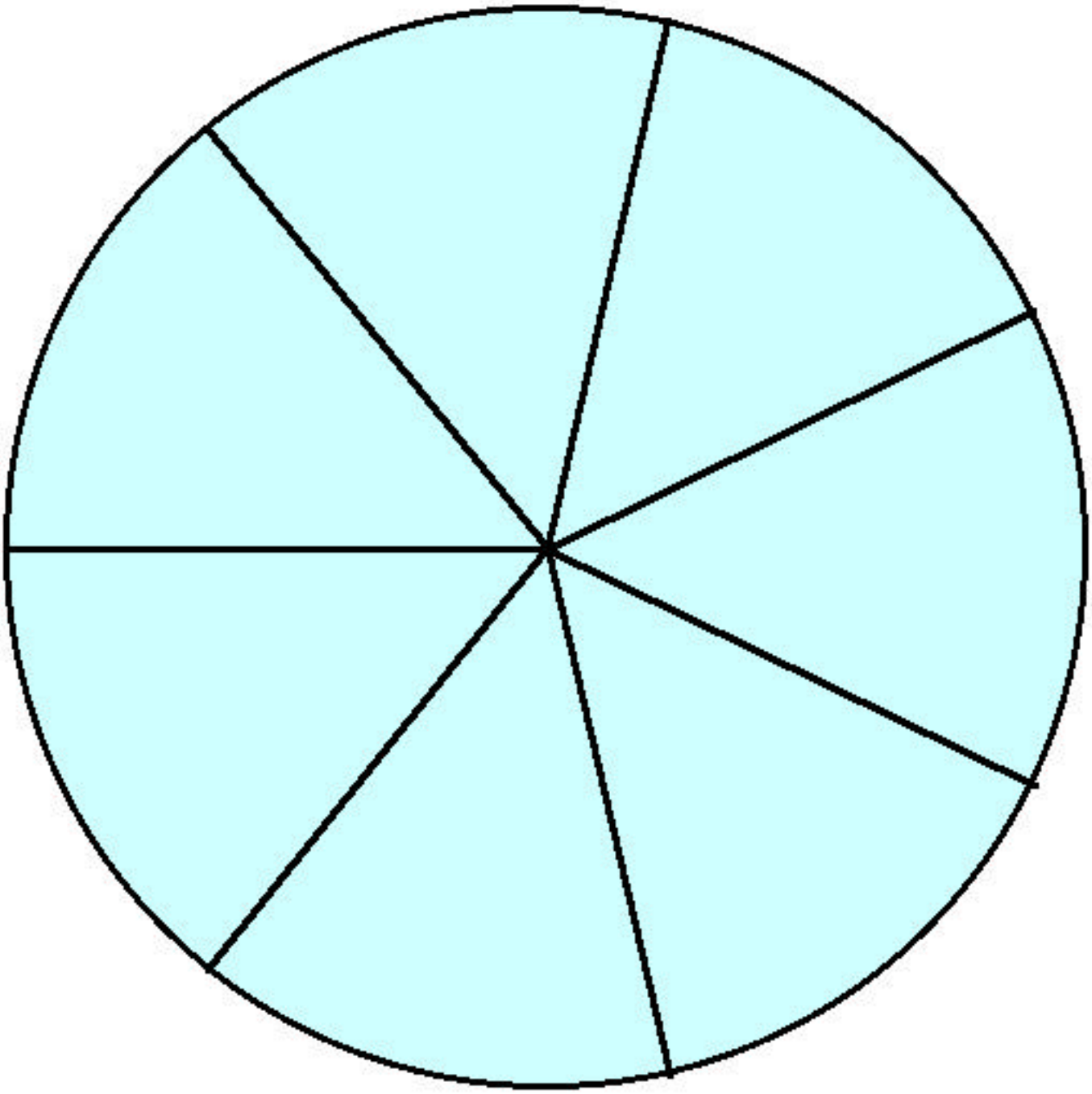


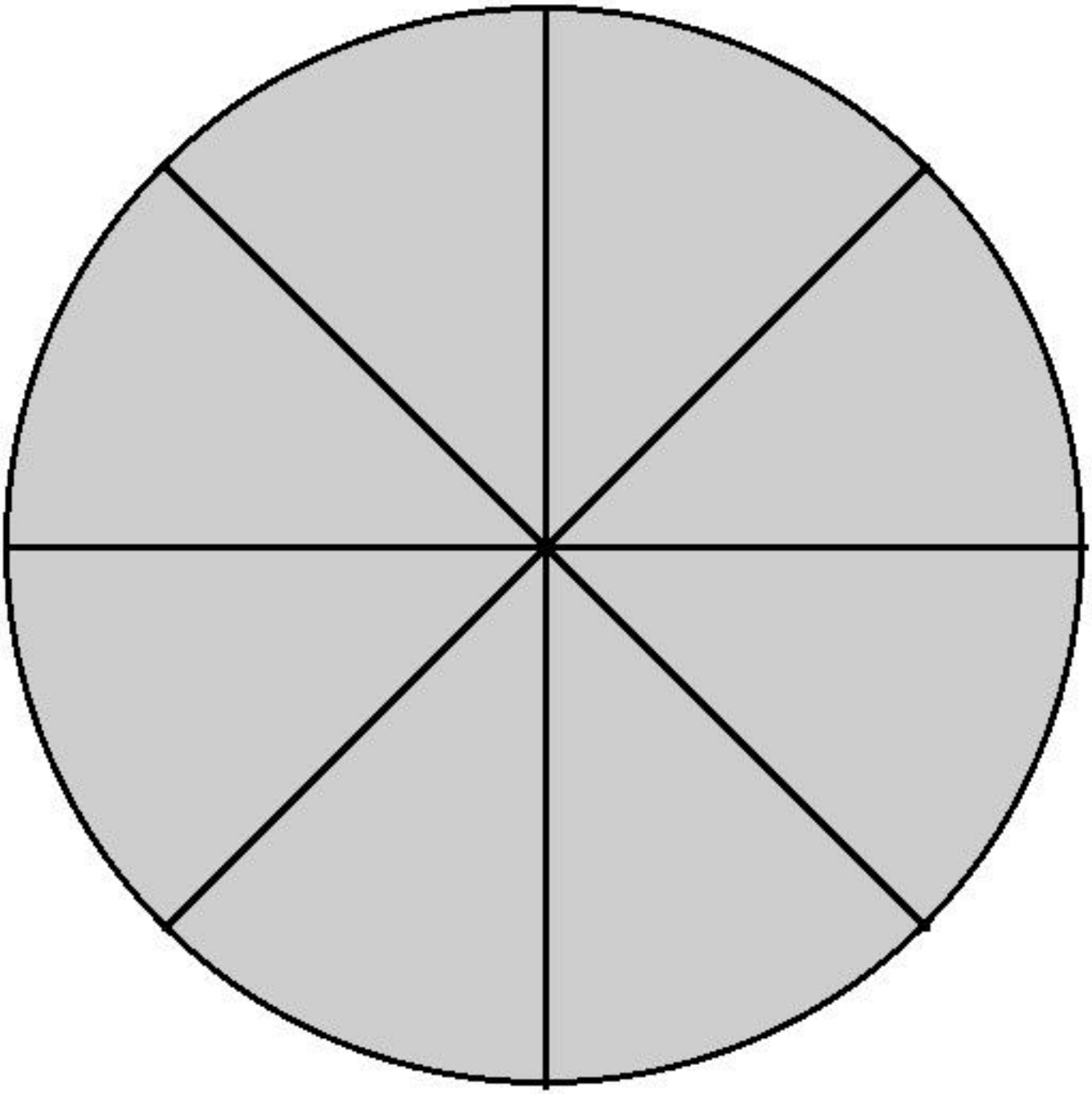


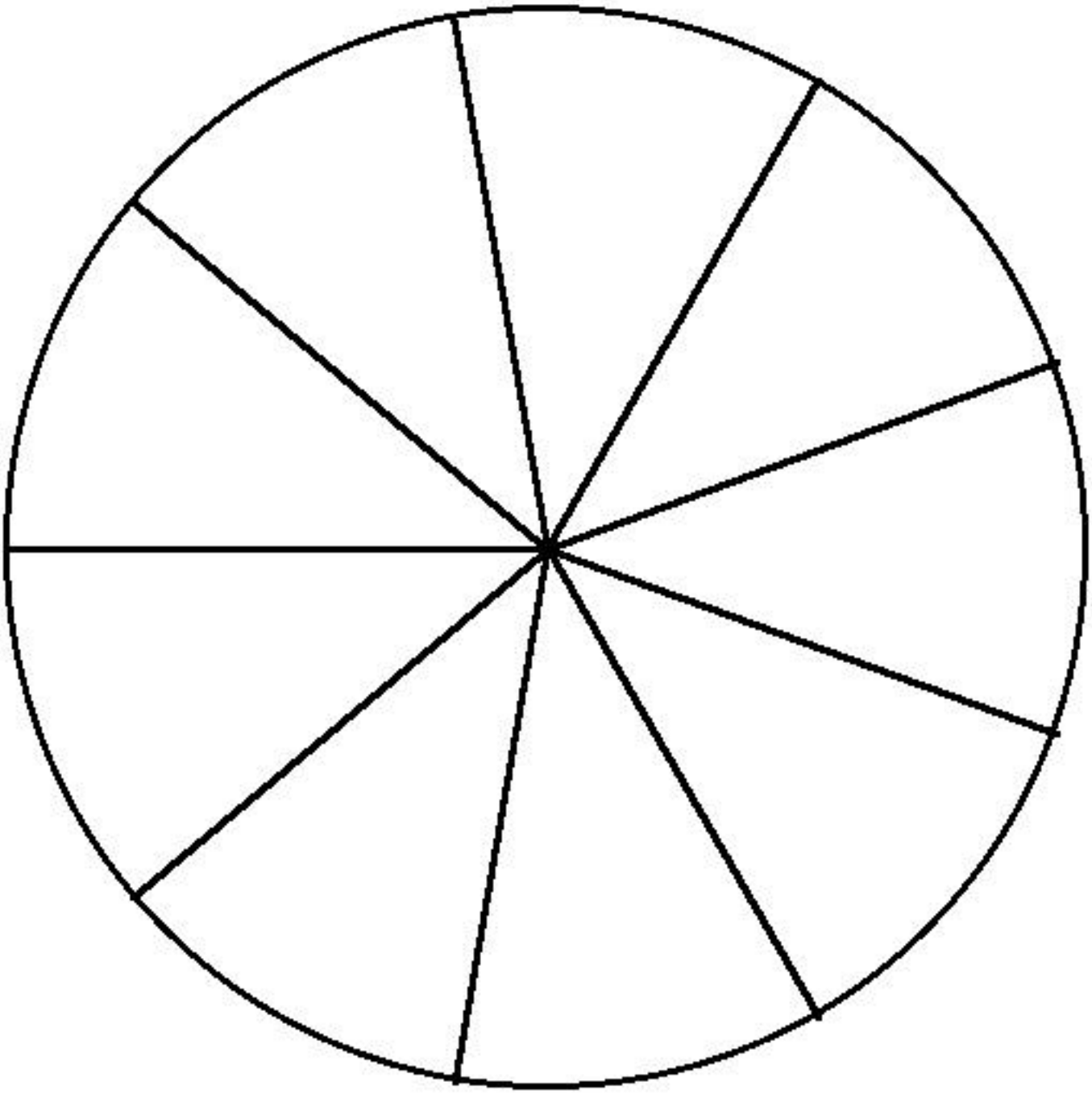


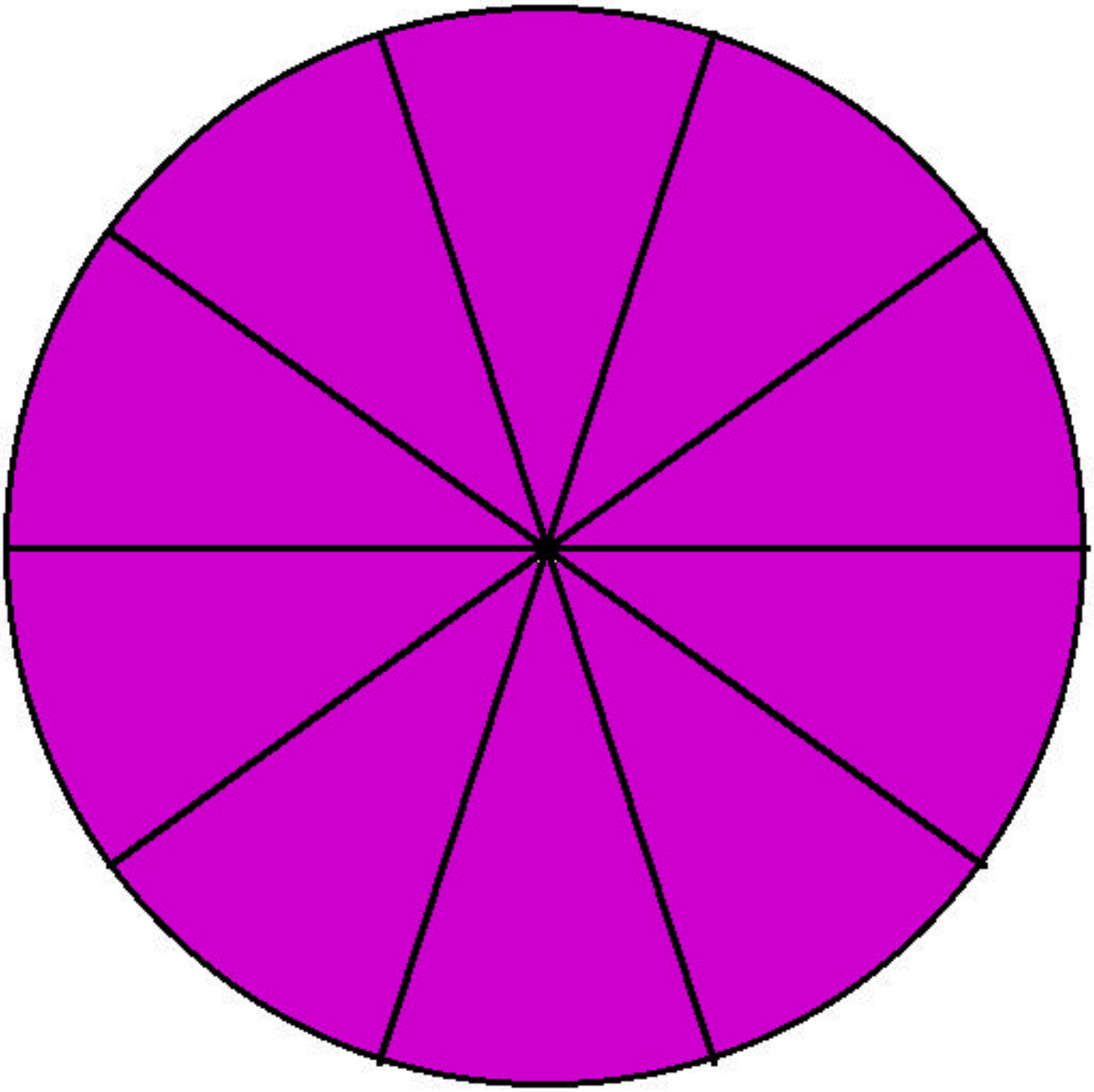


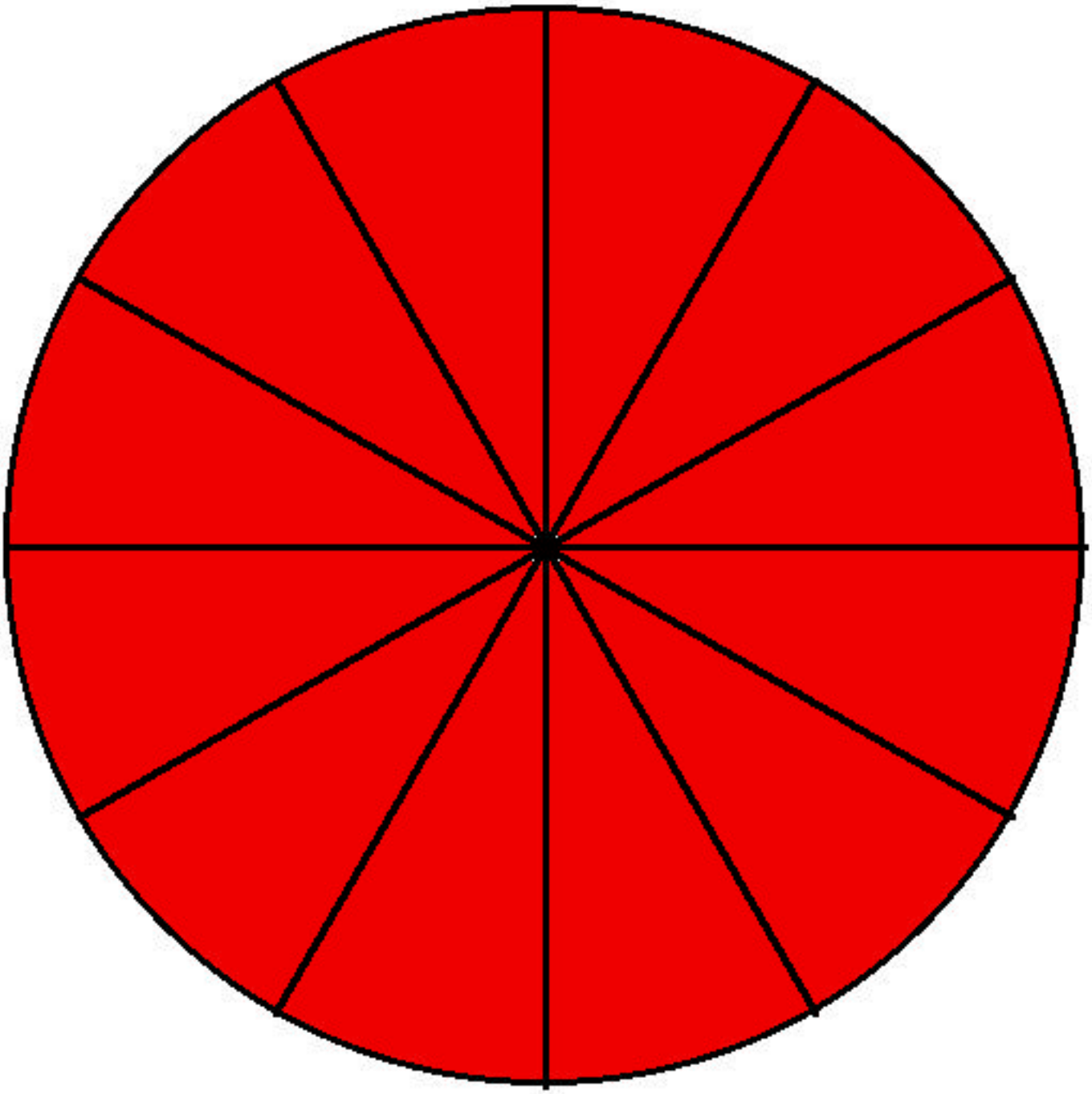


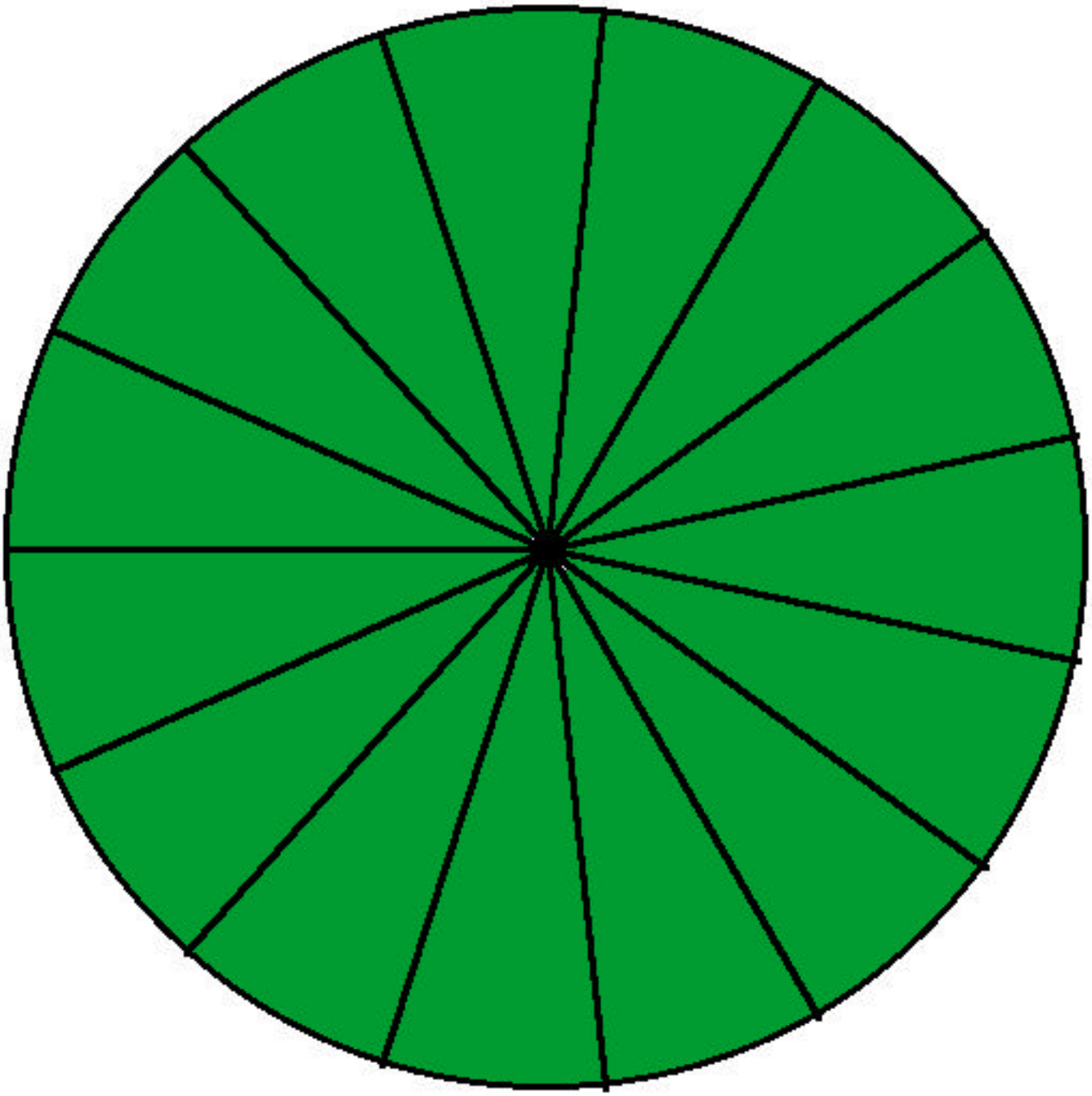












Name _____ Parent/Child Activity Sheet

Explorations With the Fraction Circles

1. How many different colors are in your folder? _____
2. Which color has the most pieces? _____
3. Which color has the fewest pieces? _____
4. How many light blue pieces are there? _____

   How many dark blue pieces are there? _____
5. How many dark blue pieces does it take to cover a yellow piece? _____
6. Can you find two different pieces to cover a yellow piece?

   Which colors did you use? _____
7. Cover the yellow piece using smaller pieces of one color.

   What color did you use? _____

   How many did you use? _____
8. Is a pink piece larger, equal to or smaller than two red pieces? _____
9. Cover a brown piece by using several smaller pieces.

   Which colors did you use? _____

   How many did you use? _____

Name _____ Quiz 1 Naming Fractions

1. The yellow piece is the unit. What fraction name can you give each of these pieces:

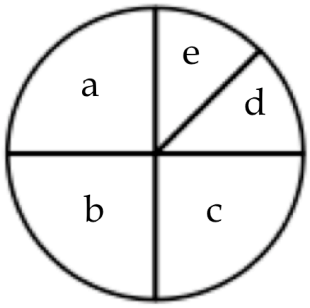
   1 blue _____

   2 grays _____

   4 reds _____

2. Draw a circle divided into 6 equal parts. Shade 5 of those parts. What fraction of the circle is shaded?

Name _____ Quiz 1 Naming Fractions

3. 

What fraction circle color would a, b, or c be?_____

What fraction of the circle is a? _____

What fraction of the circle is a, b and c combined?_____

What fraction of the circle is e?_____

4. Draw a rectangle divided into 8 equal parts. Shade in 5 parts. Write the fraction amount shaded in word.

5. You want to share your pan of brownies equally among yourself and your 8 friends. Draw a picture of your pan of brownies showing how you would divide it up to share. What fraction of the pan will each get?

Name _____ Quiz 2 Ordering fractions

1. Imagine the brown piece and the pink piece. Which is bigger?

2. Which is larger, $\frac{1}{6}$ or $\frac{1}{3}$? Explain your thinking.

3. Spinner A was divided into 4 equal parts with 3 parts green. Spinner B was divided into 10 equal parts with 3 parts green. Which spinner had the larger amount green? Explain your thinking.

Name _____ Quiz 2 Ordering fractions

4. Circle the larger fraction. Explain your thinking for each example.

$\frac{2}{4}$ $\frac{2}{3}$

$\frac{1}{10}$ $\frac{1}{20}$

$\frac{4}{5}$ $\frac{2}{5}$

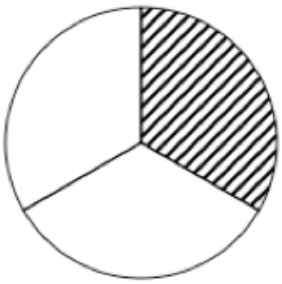
$\frac{3}{9}$ $\frac{6}{9}$

Name _____ Quiz 3 Fraction Equivalence

1. How many pinks equal 1 brown? _____

2. $\frac{1}{3} = \frac{\quad}{6}$

3. Give two fraction names for the shaded amount in each picture. You may draw on the pictures to help you find equivalent fractions.



Name _____ Quiz 3 Fraction Equivalence

4. Use your fraction circles to find equivalent fractions

$$\frac{1}{4} = \frac{\quad}{8}$$

$$\frac{3}{4} = \frac{9}{\quad}$$

$$\frac{1}{2} = \frac{\quad}{6}$$

Name _____ Quiz 4 Chip (tile) model

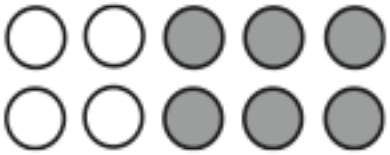
1. Draw a picture of chips (or tiles) to show each fraction below. Use 8 chips as the unit for each example.

$\frac{3}{4}$	
$\frac{1}{2}$	
$\frac{3}{8}$	

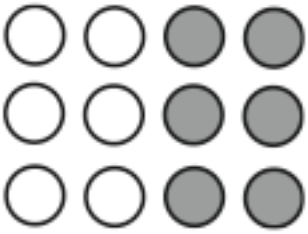
2. Show $\frac{2}{3}$ with chips (or tiles) using two different units.

Name _____ Quiz 4 Chip (tile) model

3. How many fifths are shaded?



4. Give three fraction names for the amount shaded.



5. Draw a picture of $\frac{1}{3}$ using 12 chips (or tiles). What is another fraction amount for the picture drawn?

Name _____ Quiz 5 ½ and fractions > 1

1. If the whole circle is the unit, name the amount shaded in two different ways.

2. Draw a picture to show $\frac{6}{4}$. Name that amount using a mixed fraction.

3. List three fractions equal to $\frac{1}{2}$.

Name _____ Quiz 5 ½ and fractions > 1

4. Circle the larger fraction in each pair:

$\frac{1}{2}$ $\frac{2}{3}$

$\frac{2}{4}$ $\frac{5}{12}$

$\frac{3}{4}$ $\frac{2}{12}$

$\frac{12}{15}$ $\frac{5}{10}$

$\frac{2}{8}$ $\frac{10}{12}$

5. Challenge: Which is bigger: $\frac{3}{4}$ or $\frac{2}{3}$? Explain your thinking.

Name _____ Quiz 6 Adding & subtracting

1. Use fraction circles to solve this problem. Draw a picture of what you did with the circles.

$$\frac{3}{4}+\frac{1}{6}$$

2. Use your fraction circles to solve this problem. Draw a picture of what you did with the circles.

Alex needed $\frac{3}{4}$ *cup of sugar to bake cookies. When he measured out the sugar, he had only* $\frac{1}{2}$ *cup of sugar. How much more sugar did he need?*

Name _____ Quiz 6 Adding & subtracting

3. Ty noticed that there was $\frac{6}{8}$ of a pizza left over. He ate an amount equal to $\frac{1}{4}$ of the pizza. How much of a whole pizza was left? Use your fraction circles to solve and draw a picture of what you did.

4. Is the answer to this problem greater than one or less than one? Explain your thinking.

$$\frac{4}{5}+\frac{1}{6}$$

5. Is this a reasonable answer? Explain your thinking.

$$\frac{8}{9}-\frac{4}{6}=\frac{4}{3}$$

Name _____ Date _____

End of Module Fraction Assessment

The purpose of this test is to find out what you know about fractions. You will be shown 3 problems on the overhead. Estimate the answer by recording in each box the whole number the answer is closet to.

1.

2.

3.

Name_____

Initial Fraction Ideas End of the Module Test continued

Continue to work on the rest of the test on your own. Show all the work you do to solve each problem.

4. This is the unit:

   You have two pieces this size:

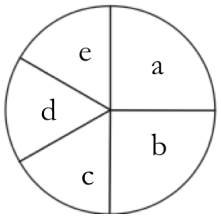
   What fraction of the unit would these two pieces be? _____

5. Bert's father cuts a cake into 8 equal sized pieces. He is going to take $\frac{3}{4}$ of the cake to the party. How many pieces of cake will he take with him?

   (a) Draw a picture below to solve the problem.

   (b) The number of pieces of cake taken to the party is _____.

6. Draw picture of $\frac{2}{3}$ using chips (or tiles) in the space below. Use a unit greater than 3 chips (or tiles).

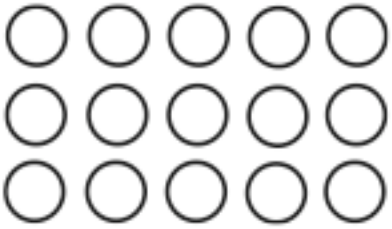
7. 

What fraction of the circle above is part c? _____

8. How many fifths are shaded?

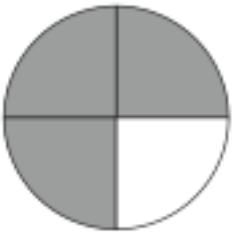
$\frac{\quad}{5}$

9. Circle $\frac{2}{3}$ of the set below:



For problems 10 – 12 give two fraction names for the shaded amount. You may draw on the pictures to help you.

10.



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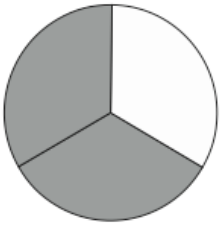

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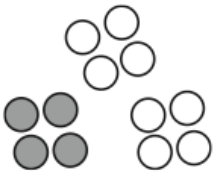


For problems 13 – 17 circle the larger fraction. If equal, circle both. Explain your reasoning for each one.

13.	$\frac{3}{4}$ $\frac{2}{3}$	
14.	$\frac{1}{2}$ $\frac{5}{8}$	
15.	$\frac{3}{12}$ $\frac{7}{12}$	
16.	$\frac{4}{9}$ $\frac{4}{11}$	
17.	$\frac{8}{14}$ $\frac{4}{9}$	

You may use your fraction circles on the last five problems. Draw pictures to show what you did with the circles.

18. Liana ate $\frac{3}{8}$ of a small pizza. The next day she ate $\frac{1}{4}$ of a small pizza. How much of a pizza did she eat altogether?

19. Ann and Josie receive the same allowance. Josie spent 4-ninths of hers on CDs. Ann spent 1-third of her allowance repairing her bicycle. Josie spent how much more of her allowance than Ann?

Show Pictures Here

20. $\begin{array}{r} \frac{5}{6} \\ +\frac{2}{6} \\ \hline \end{array}$

21. $\begin{array}{r} \frac{1}{2} \\ -\frac{3}{8} \\ \hline \end{array}$

22. $\begin{array}{r} \frac{1}{3} \\ +\frac{2}{6} \\ \hline \end{array}$

Transparency
[These are the first three items on the test]

(1) $\frac{7}{8} + \frac{12}{13}$

(2) $\frac{3}{8} + \frac{5}{13}$

(3) $\frac{8}{9} - \frac{7}{8}$

Name _____ Date _____

Interview #1:

[Used after Lesson 10 or 11]

I am going to ask you some questions about fractions. I am very interested in how you come up with the answers, so it is important for you to tell me what you are thinking about. The interview will not be graded, so you do not have to worry about wrong answers. Are you ready?

Concept Questions

1.

(A) Use your fraction circles to show a model for the fraction 3/5.

(B) Now I want you to explain how you know that this models 3/5.

(C.) Now can you show me another way to model $\frac{3}{5}$ using the same fraction circles? Explain how the two models are alike and different.

Interview #1 continued

2. Display 15 tiles without counting or telling the child how many there are. [This is an extension. Tiles have not been introduced as a model yet].

(A) Say: You can arrange the tiles any way you want. I want you to show me the fraction $\frac{3}{5}$ with these tiles.

(B) Explain what you were thinking in order to solve this problem.

(C) Show me a model for $\frac{3}{5}$ using a different number of tiles. How are the two tile-models alike? How are they different?

(D) How is this model for 3/5 like your fraction circle models? How are they different?

Order Questions

[Same numerator]

3. Say: I'm going to show you word names for two fractions. I'll ask you to tell me whether they are equal or one is less.

Ready? 1-fifth and 1-sixth. Are they equal or is one less? Which is less? Explain your reasoning. [Do you imagine or picture something in your mind to help you tell which is less?]

Interview #1 continued

[Same denominator]

4. Say: I'm going to show you word names for two new fractions. I'll ask you to tell me whether they are equal or if one is less.

   Ready? 3-ninths and 4-ninths. Are they equal or is one less? Which is less? Explain your reasoning. [Do you imagine or picture something in your mind to help you tell which is less?]

[Transitive]

5. Read this story to the student:

   Jon and Lara each ordered a small pizza at Domino's. Jon's pizza was cut into 8 equal-sized parts. Lara's was cut into 6 equal-sized parts. Jon ate 5 pieces; Lara ate 2 pieces. Did they eat the same amount, or did one eat less?

   Explain your reasoning. [Do you imagine or picture something in your mind to help you tell which is less?]

[Residual]

6. Read this story to the student:

   Mark and William both had bags of M&M peanut candies. The bags held the same number of candies. Mark ate 2-thirds of his bag. William ate 3-fourths of his bag. Did they eat the same amount or did one eat less?

   Explain your reasoning. [Do you imagine or picture something in your mind to help you tell which is less?]

Concept of Unit Questions

7. Show and read the statement:

Tim used 6 cubes to build $\frac{1}{5}$ *of an orange tower. How tall will the whole tower be when it's finished?*

(A) Provide unifix cubes and ask students to show you how to use these cubes to solve the problem. Ask students to talk aloud as they solve the problem.

(B) **[If correct repeat changing the data: 8 cubes;** $\frac{2}{3}$**]**

Name _____ Date _____

Interview #2
Use after Lesson 15 or 16

I am going to ask you some questions about fractions. I am very interested in how you come up with the answers, so it is important for you to tell me what you are thinking about. The interview will not be graded, so you do not have to worry about wrong answers. Are you ready?

Concept Questions

1. Display 15 tiles without counting or telling the child how many there are.

(A) Say: You can arrange the tiles any way you want. I want you to show me the fraction $\frac{2}{3}$ with these tiles.

(B) Explain what you were thinking in order to solve this problem.

(C) Show me a model for $\frac{2}{3}$ using a different number of tiles. How are the two tile-models alike? How are they different?

2. Read this story to the student:

> *Mary and Jose both have some money to spend. Mary spends $\frac{1}{4}$ of hers and Jose spends $\frac{1}{4}$ of his. Is it possible that Mary and Jose spent the same amount of money?* Tell me what you are thinking.

Interview #2 continued

Order Questions

[Same numerator]
3. Say: Here are two fractions.

   Show: $\frac{3}{5}$ $\frac{3}{4}$

   Say: Are they equal or is one less? Which one is less? Tell me how you know. Did you picture anything in your mind as you thought about these fractions?

[Same numerator]
4. Say: Here are two fractions.

   Show: $\frac{1}{17}$ $\frac{1}{19}$

   Say: Are they equal or is one less? Which one is less? Tell me how you know. Did you picture anything in your mind as you thought about these fractions?

[Same denominator]
5. Say: Here are two fractions.

   Show: $\frac{14}{26}$ $\frac{18}{26}$

   Say: Are they equal or is one less? Which one is less? Tell me how you know. Did you picture anything in your mind as you thought about these fractions?

Interview #2 continued

[Residual]
6. Read this story to the student:

Alice and Janis both receive the same allowance. Alice spent $\frac{4}{5}$ *of hers on a movie. Janis spent* $\frac{9}{10}$ *of hers on a new CD. Did they spend the same amount or did one spend less?* [If less ask: who spent less?]

Say: Tell me how you know. Did you picture anything in your mind as you thought about these fractions?

[Transitive]
7. Read this story to the student:

Mark and Jenny walk home from school. Mark walks $\frac{3}{8}$ *of a mile. Jenny walks* $\frac{6}{9}$ *of a mile. Do they walk the same amount or does one walk less?*

Say: Tell me how you know. Did you picture anything in your mind as you thought about these fractions?

Interview #2 continued

Concept of Unit Questions

8. Show the red fraction piece.

   Say: This is $\frac{1}{6}$ of my unit. With your fraction circles, show me the unit. Talk aloud as you sole the problem explaining each step. Record answer.

   [If correct change data: pink is $\frac{2}{3}$; find the unit].

9. Read this story to the student:

   Ten children went to a party in a group. This group of 10 children was $\frac{2}{5}$ of all the children who were invited. How many children were invited?

   Provide tiles and ask the student to show you how to use these tiles to solve the problem. Ask students to talk aloud as they solve the problem. Record answer.

Name _____ Date _____

Interview #3
Use before Lesson 19

I am going to ask you some questions about fractions. I am very interested in how you come up with the answers, so it is important for you to tell me what you are thinking about. The interview will not be graded, so you do not have to worry about wrong answers. In fact, you have not worked on the type of problems I will ask about. I am interested in how you try to solve them before you learn from your teacher how to do them.

1. Read this story to the student:

   Sally ate $\frac{2}{3}$ of a pizza for dinner. The next morning she ate another $\frac{1}{6}$ of a pizza. How much of a pizza did she eat altogether?

   (A) Say: Without working out the exact answer, give me an estimate that is reasonable. (If needed, provide clues: Is the answer >1/2 or <1/2? Is the answer >1 or <1?

   (B) Say: Tell me what you were thinking to reach this estimate.

   (C) Say: Using fraction circles, act out how you would find the exact answer. Talk aloud as you solve the problem.

   (D) If the student was successful, ask student to record each step with the fraction circles with symbols.

Interview #3 continued

2. Read this story to the student:

A movie costs Jane $\frac{1}{6}$ *of her allowance. If she only had* $\frac{11}{12}$ *of her allowance before the movie, what fraction of her allowance did she have after the movie?*

(A) Say: Without working out the exact answer, give me an estimate that is reasonable. (If needed, provide clues: Is the answer $>\frac{1}{2}$ or $<\frac{1}{2}$? Is the answer >1 or <1?).

(B) Say: Tell me what you were thinking to reach this estimate.

(C) Say: Using fraction circles, act out how you would find the exact answer. Talk aloud as you solve the problem.

(D) If the student was successful, ask student to record each step with the fraction circles with symbols.

Interview #3 continued

3. Read this story to the student:

Josie and Al each receive the same allowance. Al spent $\frac{6}{10}$ *of his allowance on a book. Josie spent* $\frac{4}{5}$ *of her allowance to fix her skateboard. How much more did Josie spend?*

(A) Say: Without working out the exact answer, give me an estimate that is reasonable. (If needed, provide clues: Is the answer $> \frac{1}{2}$ or $< \frac{1}{2}$? Is the answer >1 or <1?).

(B) Say: Tell me what you were thinking to reach this estimate.

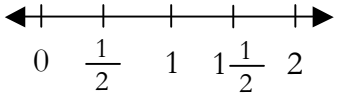
(C) Say: Using fraction circles, act out how you would find the exact answer. Talk aloud as you solve the problem.

(D) If the student was successful, ask student to record each step with the fraction circles with symbols.

Interview #3 continued

4. (A) Say: Tell me about where the answer to this addition problem would be on this number line.

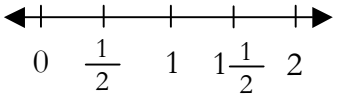
$\frac{3}{4} + \frac{1}{3}$



(B) Say: Tell me how you know.

5. (A) Say: Tell me about where the answer to this addition problem would be on this number line.

$\frac{7}{8} - \frac{1}{2}$



(B) Say: Tell me how you know.

6. Say: Jon calculated the problem as follows: $\frac{2}{3} + \frac{1}{4} = \frac{3}{7}$

Ask: Do you agree? Tell me all you can.

Name _____ Date _____

Interview #4: End of Unit

I am going to ask you some questions about fractions. I am very interested in how you come up with the answers, so it is important for you to tell me what you are thinking about. The interview will not be graded, so you do not have to worry about wrong answers. Are you ready?

Concept Questions

1. Display a bag of chips without counting or telling the child how many there are.

(A) Say: I want you to show me $\frac{2}{3}$ using the chips as your model. Use as many chips as you want.

(B) Explain what you were thinking in order to solve this problem.

(C) Can you do this in another way? How are your two alike and different?

Interview #4 continued

2. Read this to the student:

Martin ate 1 $\frac{2}{3}$ *pizza.*

(A) Name the amount Martin ate in another way.

(B) Draw a picture to verify your answer. Explain what the picture shows.

Order Questions

[Same numerator]
3. Say: I am going to write 3 fractions

Write: $\frac{1}{5}$ $\frac{1}{3}$ $\frac{1}{4}$

(A) Say: I want you to write them in order from smallest to largest.

(B) Say: Tell me how you know.

[Same numerator]
4. Say: I'm going to write two fractions.

Write: $\frac{4}{35}$ $\frac{4}{29}$

(A) Say: Are they equal or is one less? Which one is less?

(B) Say: Tell me how you know.

Interview #4 continued

[Transitive]
5. Say: I'm going to write two fractions.

   Write: $\frac{8}{12}$ $\frac{3}{7}$

   (A) Say: Are they equal or is one less? Which one is less?

   (B) Say: Tell me how you know.

[Same Denominator]
6. Say: I'm going to write two fractions.

   Write: $\frac{27}{64}$ $\frac{19}{64}$

   (A) Say: Are they equal or is one less? Which one is less?

   (B) Say: Tell me how you know.

Interview #4 continued

[Residual]
7. Say: I'm going to write two fractions.

   Write: $\frac{4}{5}$ $\frac{9}{10}$

   (C) Say: Are they equal or is one less? Which one is less?

   (D) Say: Tell me how you know.

[Equivalence Questions]
8. Say: I'm going to write two fractions.

   Write: $\frac{3}{4}$ $\frac{9}{12}$

   (C) Say: Are these fractions equal or is one less? Which one is less?

   (D) Say: Tell me how you know.

Interview #4 continued

[Equivalence Questions]
9. Say: I'm going to write two fractions.

   Write: $\frac{6}{9}$ $\frac{4}{6}$

   (E) Say: Are they equal or is one less? Which one is less?

   (F) Say: Tell me how you know.

Concept of Unit Questions

10. Show and read the statement:

   Tina was building towers with cubes. Tina finished building $1\frac{1}{3}$ *towers. She used 12 cubes for these towers. How many cubes is one tower?*

   Ask student to solve the problem. Provide Unifix cubes. Ask students to talk aloud as they solve the problem.

11. (A) Say: This brown piece is $\frac{4}{6}$ of some unit. What is the unit? Use the fraction circles to show me. Talk aloud as you do this.

   (B) If correct ask this: This yellow piece is 1 and $\frac{1}{2}$ of some unit. What is the unit? Use the fraction circles to show me. Talk aloud as you do this.

Interview #4 continued

Operations

12. Read this story to the student:

Marty was making two types of cookies. He used $\frac{1}{4}$ *cup of flour for one recipe and* $\frac{2}{3}$ *cup of flour for the other. How much flour did he use altogether?*

(A) Say: Without working out the exact answer, give me an estimate that is reasonable. (If needed, provide clues: Is the answer $>\frac{1}{2}$ or $<\frac{1}{2}$? Is the answer >1 or <1?).

(B) Say: Tell me what you were thinking to reach this estimate.

(C) Say: Using fraction circles, act out how you would find the exact answer. Talk aloud as you solve the problem.

(D) If the student was successful, ask student to record each step with the fraction circles with symbols.

Interview #4 continued

13. Read this story to the student:

Martin and Jane each ordered small pizzas at Dominos. Jane ate $\frac{5}{8}$ *of her small pizza. Martin ate* $\frac{3}{4}$ *of his small pizza. Who ate more? How much more?*

(A) Say: Without working out the exact answer, give me an estimate that is reasonable. (If needed, provide clues: is the answer > $\frac{1}{2}$ or < $\frac{1}{2}$? Is the answer >1 or <1?)?

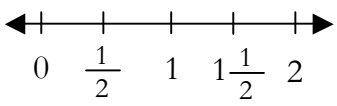
(B) Say: Tell me what you were thinking to reach this estimate?

(C) Say: Using fraction circles, (or paper folding) act out how you would find the exact answer. Talk aloud as you solve the problem.

(D) If the student was successful, ask the student to record each step with the fraction circles with symbols.

14. (A) Say: Tell me about where the answer to this problem would be on this number line.

$\frac{2}{3} + \frac{1}{6}$



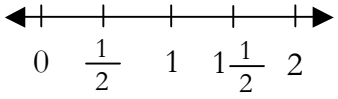
(B) Say: Tell me how you know.

Interview #4 continued

(C) Say: Using paper and pencil, how can you figure out the exact answer? Explain what you are doing.

15. (A) Say: Tell me about where the answer to this problem would be on this number line.

$\frac{8}{9} - \frac{1}{3}$



(B) Say: Tell me how you know.

(C) Say: Using paper and pencil, how can you figure out the exact answer? Explain what you are doing.