

## PDM7-9 Tallies and Frequency Tables

1. Renia surveyed 35 students about their favourite subject. Unfortunately, she spilled water on her paper and smeared the French tally. Can you complete her data chart?

Subject	Math	Science	History	French	Gym
Tally	### ## //	//	### //		### ##

- a) List the subjects from **most** favourite to **least** favourite.

\_\_\_\_\_

- b) There are 100 students in Renia's grade. Using the results of her survey, predict the number of students in her grade who have history as their favourite subject. \_\_\_\_\_

How did you know? \_\_\_\_\_

2. Ms. Smith records the class results from a science test. When she tallies a mark, she crosses it off her list so that she knows she has counted it.

~~A~~ ~~B~~ D C ~~B~~ ~~B~~ ~~A~~ ~~B~~ B ~~A~~ B B C C B A B D B B ~~A~~ C C

After she has finished tallying all the As and some of the Bs, her tally chart looks like this.

Mark	Tally	Frequency	Fraction of students
A	////	4	
B	////		
C			
D			

- a) Did she miss any As? \_\_\_\_\_ Fill in any As she missed and correct her frequency total. Complete the tally and the frequency columns.
- b) How many students wrote the test altogether? \_\_\_\_\_
- c) How many students got Ds? \_\_\_\_\_
- d) What fraction of the students received Ds? \_\_\_\_\_
- e) What fraction of students got other marks? Complete the last column of the chart.
- f) How will Ms. Smith find the average — will she use the mean, the median, or the mode?
- g) Did more than half of Ms. Smith's students get at least a B?

3. A **frequency table** shows how many times a data value occurs in a set. A **relative frequency table** shows the fraction of time each data value occurs. Complete the frequency table and the relative frequency table for this tally chart in your notebook.

Favorite Types of Movies	
Comedy	### ## ##
Drama	### /
Action	### ## ##

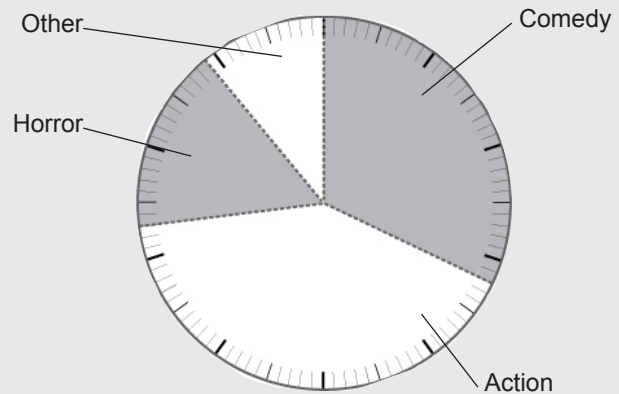
# PDM7-10 Circle Graphs

Many people use **percents** to show data.

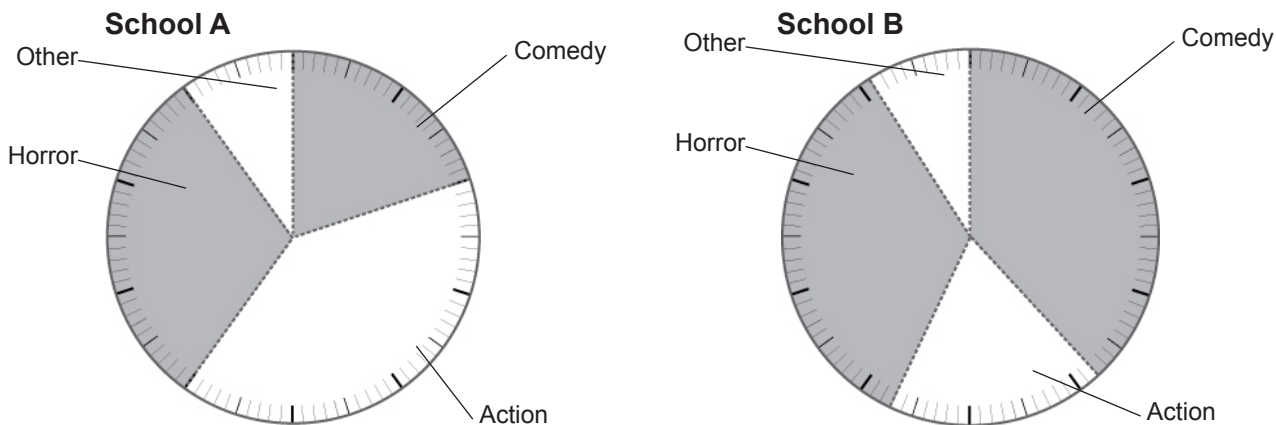
Miki surveyed 100 Grade 7 students in his city about their favourite type of movie.

He uses a circle divided into **100 equal parts** to show his results.

Favourite Type of Movie	
Comedy	32%
Action	41%
Horror	16%
Other	11%



1. a) What percent of Grade 7 students like each type of movie in each school? Complete the chart.



	Comedy	Action	Horror	Other	Total
School A					
School B					

- b) What is the total percent for each school? Why does this make sense?

2. Gisela copied down the following percents from a circle graph she saw on the Internet.

Favourite Type of Movies			
Comedy	Action	Horror	Other
48%	21%	26%	9%

How can you tell that she made a mistake?

3. Calli and Bilal go to different schools.

They surveyed the Grade 7 students at their schools about their favourite types of music.

Calli's School	
Type of music	Number of students
Classical	10
Rock	20
Pop	140
Other	30

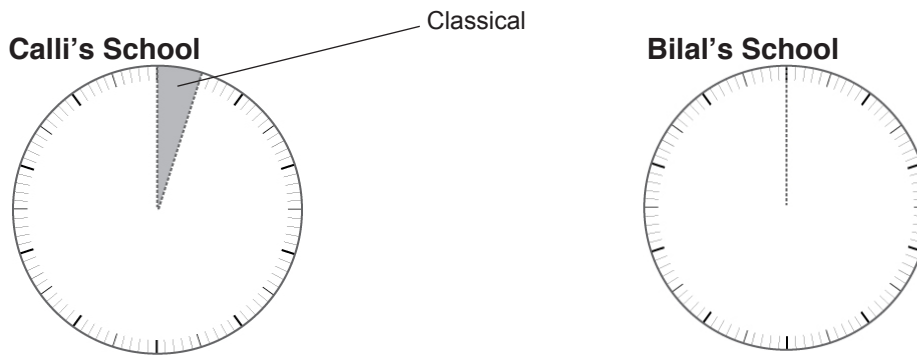
Bilal's School	
Type of music	Number of students
Classical	20
Rock	15
Pop	5
Other	10

a) How many Grade 7 students did Calli survey? \_\_\_\_\_ How many did Bilal survey? \_\_\_\_\_

b) Find the fraction of Grade 7 students at each school who like each type of music.  
Turn the fraction into an equivalent fraction over 100, and then change it to a percent.

Example:  $\frac{\text{number of Grade 7 students who like classical music at Calli's school}}{\text{number of Grade 7 students in total at Calli's school}} = \frac{10}{200} = \frac{5}{100} = 5\%$

c) Complete the circle graphs to show the percents you calculated in part b).

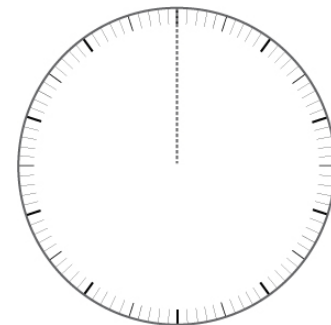


d) More people at Calli's school than at Bilal's school like rock music. Why does your circle graph not show this?

e) Whose school do you think is more like yours—Calli's, Bilal's, or neither? Why?

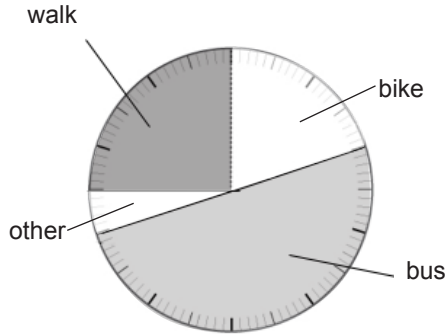
4. Complete the relative frequency table, then draw a circle graph.

Favourite Type of Book	Frequency	Fraction	Percent
Mystery	16	$\frac{16}{40} = \frac{2}{5}$	$\frac{2 \times 20}{5 \times 20} = \frac{40}{100} = 40\%$
Fantasy	4		
Romance	12		
Other	8		



# PDM7-11 Drawing Circle Graphs

1. a) Find the percent of students who use each mode of transportation to get to school. Then use a protractor to find the angle of each section in the circle.



	Percent	Angle in circle
walk	25%	90°
bike		
bus		
other		

- b) Add the percents in your chart. \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ = \_\_\_\_\_  
Do you get a total of 100%? If not, find your mistake.
- c) Add the angles in your chart. \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ + \_\_\_\_\_ = \_\_\_\_\_  
Do you get a total of 360°? If not, find your mistake.

**REMINDER ►** To calculate 15% of 60, change 15% to a fraction ( $15\% = \frac{15}{100}$ ), replace “of” with a multiplication sign ( $\times$ ), and multiply:

$$\begin{aligned}
 15\% \text{ of } 60 &= \frac{15}{100} \times 60 \\
 &= \frac{3}{20} \times 60 \\
 &= \frac{180}{20} = 9
 \end{aligned}$$

- d) According to the “walk” section in the circle graph above, 90° is 25% of 360°. Check this by calculating 25% of 360°.

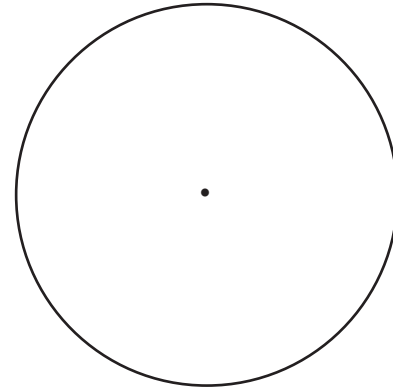
- e) According to the “bike” section, \_\_\_\_\_° is \_\_\_\_\_% of 360°.  
According to the “bus” section, \_\_\_\_\_° is \_\_\_\_\_% of 360°.  
According to the “other” section, \_\_\_\_\_° is \_\_\_\_\_% of 360°.
- f) Check each statement in part e) by calculating the percent.
- bike: \_\_\_\_\_ bus: \_\_\_\_\_ other: \_\_\_\_\_

2. Complete each chart and then use your protractor to draw a circle graph. Use labels to make it clear what each part of the circle represents. Make sure all your percents total 100% and all your angles total 360°.

a) Survey results: Daily newspaper habit

Title: \_\_\_\_\_

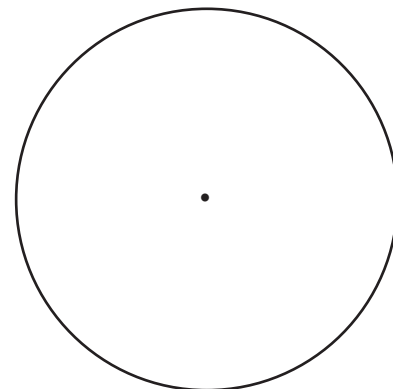
	Percent	Angle in circle
delivered to home	40%	
buy occasionally	50%	
never look at	10%	



b) Survey results: How students spend money

Title: \_\_\_\_\_

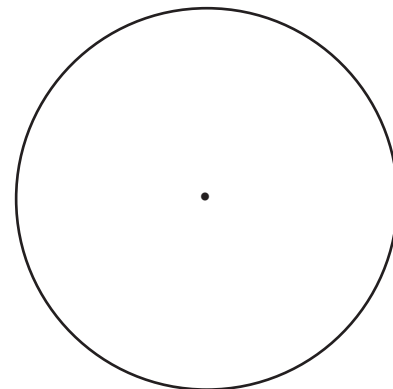
	Percent	Angle in circle
entertainment (movies, CDs, etc.)	45%	
clothes and personal care	30%	
snacks	10%	
savings	15%	



c) Survey results: Favourite kind of pie

Title: \_\_\_\_\_

	Percent	Angle in circle
apple	20%	
blueberry	15%	
cherry	10%	
other	55%	



3. Write each fraction as an equivalent fraction over 100 and then as a percent.

a)  $\frac{3}{10} = \frac{\quad}{100} = \quad\%$

b)  $\frac{7}{25} = \frac{\quad}{100} = \quad\%$

c)  $\frac{9}{20} = \frac{\quad}{100} = \quad\%$

d)  $\frac{33}{75} = \frac{\quad}{25} = \frac{\quad}{100} = \quad\%$

e)  $\frac{12}{30} = \frac{\quad}{10} = \frac{\quad}{100} = \quad\%$

f)  $\frac{52}{80} = \frac{\quad}{20} = \frac{\quad}{100} = \quad\%$

4. Write each fraction as an equivalent fraction over 360 to determine the degree measure (the angle) in a circle graph.

a)  $\frac{9}{20} = \frac{\quad}{360}$

b)  $\frac{13}{40} = \frac{\quad}{360}$

c)  $\frac{70}{400} = \frac{\quad}{40} = \frac{\quad}{360}$

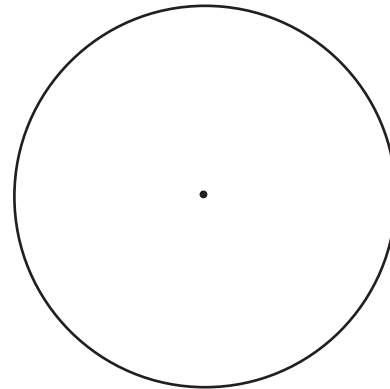
d)  $\frac{21}{108} = \frac{\quad}{36} = \frac{\quad}{360}$

5. Complete the relative frequency chart. Then draw a circle graph.

a)

Favourite Sport	Frequency	Fraction of total	Angle in circle
Hockey	8	$\frac{8}{20}$	144°
Swimming	5		
Running	4		
Other	3		

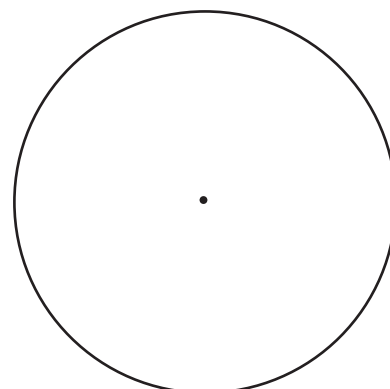
Title: \_\_\_\_\_



b)

Favourite Indoor Games	Frequency	Fraction of total	Angle in circle
Board games	11		
Card games	1		
Video games	21		
Other	3		

Title: \_\_\_\_\_



# PDM7-12 Reading Circle Graphs

To find the percent of 360° that 72° represents, follow the steps below.

<p>Write 72 as a fraction of 360.</p> $\frac{72}{360}$	<p>Reduce <math>\frac{72}{360}</math> to lowest terms.</p> $\frac{72}{360} = \frac{1}{5}$	<p>Compare this fraction to a fraction with a denominator of 100.</p> $\frac{1}{5} = \frac{\quad}{100}$	<p>Solve.</p> $\frac{1}{5} \xrightarrow{\times 20} \frac{20}{100}$ <p>So, 72 is 20% of 360.</p>
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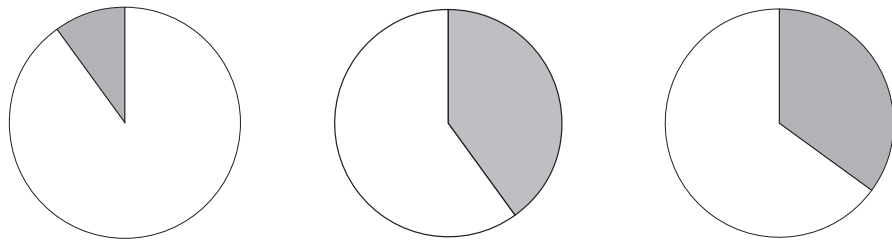
1. Calculate the percent.

- a) 90° is \_\_\_\_\_% of 360°
- b) 36° is \_\_\_\_\_% of 360°
- c) 18° is \_\_\_\_\_% of 360°
- d) 288° is \_\_\_\_\_% of 360°

2. a) Use a protractor to determine the angle of the part-time section in each circle graph. Then find the percent of people in each company who work part-time.

Full-time staff

Part-time staff



b) Each company has 60 employees. How many employees in each company work part-time?

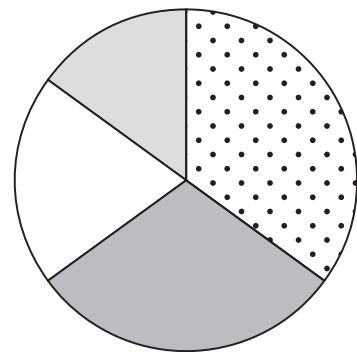
3. The circle graph below shows the percent of playing time a hockey coach gives each forward line. The first line receives more ice time than the second, the second line receives more ice time than the third, and the third receives more ice time than the fourth.

a) Give the circle graph a title.

Title: \_\_\_\_\_

b) Finish the key by labelling which line (first, second, third, or fourth) each pattern on the circle graph represents.

- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_
- \_\_\_\_\_



c) Use a protractor to determine the angle of each section in the circle graph.

d) Use your answer in c) to determine the percent of ice time each line receives.

e) If the team plays a regular 60-minute game, how much time will the second line get?

f) The team wins 3-2 after 4 minutes of overtime. Ron plays on the third line. How much time did Ron play for?

Sometimes, the angle in a circle does not correspond to a whole number percent of  $360^\circ$ .

Example: If the angle in a circle is  $30^\circ$ ,  $\frac{30}{360} = \frac{1}{12} = 0.08\bar{3} = 8.\bar{3}\%$ , so  $30^\circ$  is  $8.\bar{3}\%$  of  $360^\circ$ .

Usually, rounding the percent to 1 decimal place is enough accuracy.

Example:  $30^\circ$  is about  $8.3\%$  of  $360^\circ$ .

To change a fraction to a decimal, use long division or a calculator.

4. Change each fraction to a decimal (rounded to 3 decimal places) and then to a percent (rounded to 1 decimal place).

a)  $\frac{5}{12} \approx 0. \underline{\quad} \underline{\quad} \underline{\quad} \approx \underline{\quad}\%$

b)  $\frac{5}{36} \approx 0. \underline{\quad} \underline{\quad} \underline{\quad} \approx \underline{\quad}\%$

c)  $\frac{7}{18} \approx 0. \underline{\quad} \underline{\quad} \underline{\quad} \approx \underline{\quad}\%$

d)  $\frac{8}{15} \approx 0. \underline{\quad} \underline{\quad} \underline{\quad} \approx \underline{\quad}\%$

5. Write each angle as a fraction of  $360^\circ$ . Then find the percent of  $360^\circ$  (rounded to 1 decimal place) that each angle represents.

a)  $60^\circ$

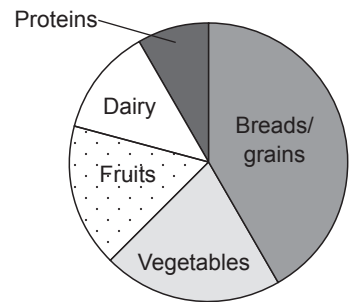
b)  $200^\circ$

c)  $40^\circ$

d)  $210^\circ$

e)  $132^\circ$

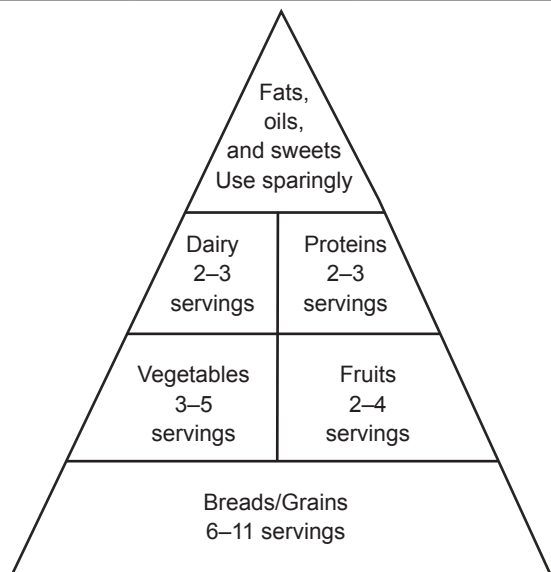
6. Lina keeps track of how many servings of each type of food she eats for a month. She draws a circle graph to show her results.



- a) Use a protractor to find the angle in the circle for each type of food.  
 b) Find the percent of  $360^\circ$  (to 1 decimal place) that each angle represents. Complete the relative frequency table.

	Breads/Grains	Vegetables	Fruits	Dairy	Proteins
Percent					

- c) Add the percents from part b). Do you get a total of 100%?  
 d) Round your answers from part b) to the nearest whole number and add the percents. Do you get a total of 100%? What happened?  
 e) If Lina eats 24 servings of food each day, how many servings of each type of food does she have each day?  
 f) Lina finds the pyramid at right on the Internet. The pyramid shows the recommended number of servings per day of each type of food. Compare what Lina eats to these recommendations. Are Lina's eating habits healthy?





# PDM7-13 Using Circle Graphs for Mean, Median, and Mode

**INVESTIGATION** ► Does repeating each data value the same number of times change the mean?

**A.** Find the mean.

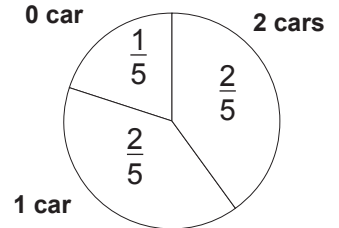
- a) 3 3 4 6 6  $(\underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad}) \div 5 = \underline{\quad}$
- b) 3 3 4 6 6 3 3 4 6 6  $(\underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad}) \times 2 \div 10 = \underline{\quad}$
- c) 3 3 4 6 6 3 3 4 6 6 3 3 4 6 6  $(\underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad}) \times 3 \div 15 = \underline{\quad}$
- d) 2 5 4 1  $(\underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad}) \div \underline{\quad} = \underline{\quad}$
- e) 2 5 4 1 2 5 4 1 2 5 4 1  $(\underline{\quad} + \underline{\quad} + \underline{\quad} + \underline{\quad}) \times \underline{\quad} \div \underline{\quad} = \underline{\quad}$

**B.** Does repeating each data value the same number of times change the mean? Explain.

**C.** Investigate what happens to the mode and the median when data values are repeated. Do the mode and the median change? Make up your own data to check.

**1.** Sally surveyed 20 families on her street to find the number of cars they have. She displays her results in both a frequency table and a circle graph.

# of cars	frequency
0	4
1	8
2	8



To find the mean (the average number of cars on the street per family), Sally uses the frequency table:

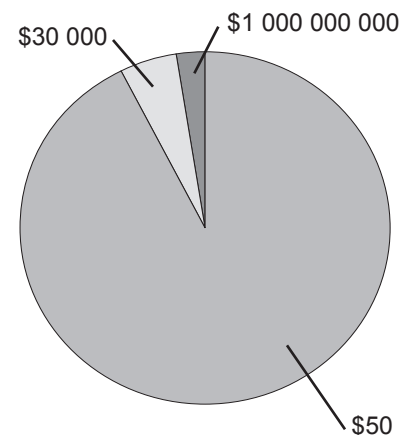
$$(0 + 0 + 0 + 0 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 1 + 2 + 2 + 2 + 2 + 2 + 2 + 2) \div 20$$

Tina finds the mean another way. She uses the circle graph and pretends there are only 5 families:

$$(0 + 1 + 1 + 2 + 2) \div 5$$

- What answers do Sally and Tina get?
- Whose method do you like better? Why?
- If Sally accidentally divides 24 by 10 instead of by 20, she gets a mean of 2.4. How can she tell immediately that she has made a mistake?

**2.** The circle graph shows the percent of people earning each annual income in a developing country.



- Use the circle graph to find the mean, median, and mode. Hint: Pretend the country has only 360 people.
- Explain why you do not need to know the population of the country to determine the mean salary.
- Would you move to this country? Why or why not?
- If you wanted to move to a country with a “good” average income, which average would you look at: the median, the mode, or the mean? Explain your answer.