

Circle Graph Angles

Organize votes and build circle graphs by hand and with technology

GRADE 6 • 6.PS.1.d

6.PS.1.d "Organize and represent data using circle graphs, with and without the use of technology tools. The number of data values should be limited to allow for comparisons that have denominators of 12 or less or those that are factors of 100..."

NAME _____

DATE _____

Materials and setup

Pencil, ruler, protractor and a spreadsheet or graphing tool. Complete Apply It 2 with technology and attach or save the graph.

BUILD UNDERSTANDING

A circle is one whole. For each category, compute count / total, its percent, and that fraction of 360 degrees. Angles must sum to 360 degrees. Check that the graph, labels and table all represent the same counts.

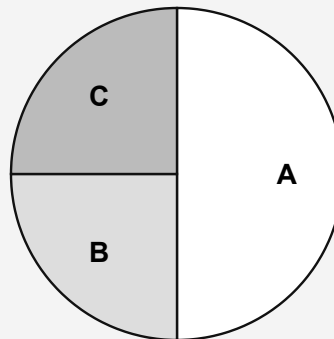
WORKED EXAMPLE

Eight students choose a class pet: fish 4, bird 2, hamster 2. How do the counts become this circle graph?

1. Divide each count by the total, 8.
2. Multiply each fraction by 360 degrees; label the sectors and title.

**Answer: Fish: $\frac{1}{2} = 50\% = 180$ degrees.
Bird and hamster: each $\frac{1}{4} = 25\% = 90$ degrees.**

Sample class pet



- A. Fish: 50%
- B. Bird: 25%
- C. Hamster: 25%

Total: 8 responses

PRACTICE 4 problems

- 1** Organize these ten simulated votes in the blank table: Art, Coding, Art, Drama, Art, Coding, Drama, Art, Coding, Art. Check the total.

CLASS ACTIVITY VOTES

Category	Count
Art	___
Coding	___
Drama	___

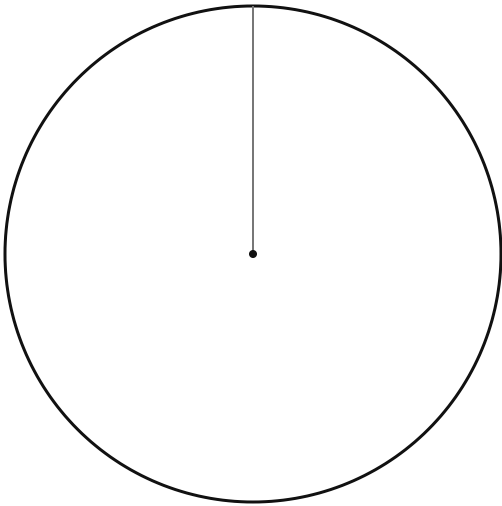
ANSWER _____

- 2** Use your table from Practice 1. Record each fraction, percent and sector angle before drawing.

ANSWER _____

- 3** Draw and label a circle graph for Practice 1. Use a protractor and the marked starting radius. Add a title and each category with its percent.

Graph title: _____



ANSWER _____

- 4** A graph for 12 votes has counts Walk 6, Games 4, Reading 2. A student proposes angles 180, 120 and 90 degrees. Check the sum and correct the error.

PROPOSED SECTOR MEASURES

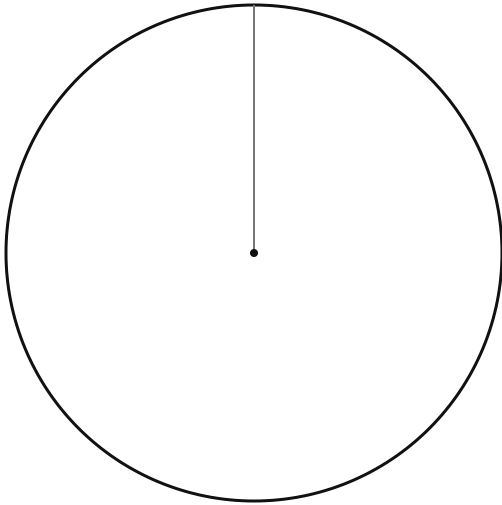
Activity	Votes	Proposed degrees
Walk	6	180
Games	4	120
Reading	2	90

ANSWER _____

APPLY IT Show your work

- 1** By hand, make a titled circle graph for 20 trip votes: Museum 7, Park 8, Farm 5. Calculate sector angles, then draw and label all three sectors with percentages.

Graph title: _____



ANSWER _____

2

Use a spreadsheet or graphing tool to represent the trip data from Apply It 1. Enter only Category and Count rows, insert a pie chart, add title and percentage labels, and save or print it. Record its three percentages and compare with your hand graph.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A tool includes a Total row of 20 as a fourth category alongside 7, 8 and 5. Explain the error and the exact table change needed. Predict the corrected Museum percentage.

WORK SPACE AND ANSWER

PRACTICE 1

Organize these ten simulated votes in the blank table: Art, Coding, Art, Drama, Art, Coding, Drama, Art, Coding, Art. Check the total.

Art 5, Coding 3, Drama 2; total 10.

PRACTICE 2

Use your table from Practice 1. Record each fraction, percent and sector angle before drawing.

Art: $5/10 = 50\% = 180$ degrees. Coding: $3/10 = 30\% = 108$ degrees. Drama: $2/10 = 20\% = 72$ degrees.

PRACTICE 4

A graph for 12 votes has counts Walk 6, Games 4, Reading 2. A student proposes angles 180, 120 and 90 degrees. Check the sum and correct the error.

The proposed angles total 390 degrees. Reading is $2/12$ of $360 = 60$ degrees, so the correct angles total $180 + 120 + 60 = 360$.

APPLY IT 2

The saved or printed technology graph shows Museum 35%, Park 40%, Farm 25%, matching the hand graph.

Use counts 7, 8 and 5; do not enter a Total row as a category. Select the full table, choose a pie chart and enable category/percentage labels. Check every sector against the hand graph.

CHALLENGE

Delete or exclude the Total row from the chart selection. It double-counts the whole and makes Museum $7/40 = 17.5\%$; the corrected graph uses $7/20 = 35\%$.

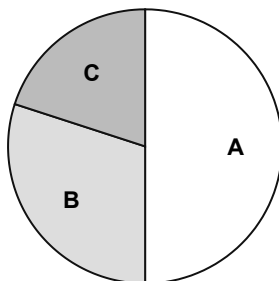
Data are simulated. Require the two student-drawn graphs and the saved or printed technology graph. Accept equivalent sector order; sector measures and category percentages must match. Allow normal protractor tolerance (about 2 degrees) while totals remain 360. Verify the underlying table excludes its Total row.

PRACTICE 3

Draw and label a circle graph for Practice 1. Use a protractor and the marked starting radius. Add a title and each category with its percent.

Class activity votes: Art 50%, Coding 30%, Drama 20%; angles 180, 108 and 72 degrees.

Class activity votes



A. Art: 50%
B. Coding: 30%
C. Drama: 20%

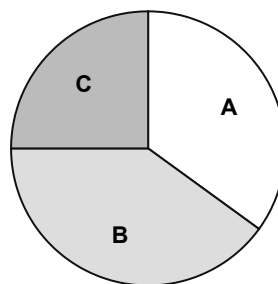
Total: 10 responses

APPLY IT 1

Museum: 35%, 126 degrees; Park: 40%, 144 degrees; Farm: 25%, 90 degrees.

Each vote is $360/20 = 18$ degrees. The angles are 7×18 , 8×18 and 5×18 ; their sum is 360.

Trip votes



A. Museum: 35%
B. Park: 40%
C. Farm: 25%

Total: 20 responses