GRADE 7 · UNIT 7 · LESSON 3

Constructing Circle Graphs

MA.7.DP.1.4

I can construct a circle graph from a table of counts: find each fraction and angle, check the total, then draw and label the sectors.

Warm-Up

1. What is the central angle of a 30% sector?
2. A circle graph of 80 students: 45% walk. How many walk?
3. Scale 1 cm : 4 m. A 6 cm line stands for how many meters?
4. Write $\frac{27}{36}$ in simplest form.

Warm-Up

1. What is the central angle of a 30% sector? **108°**
2. A circle graph of 80 students: 45% walk. How many walk?

   36 students
3. Scale 1 cm : 4 m. A 6 cm line stands for how many meters?

   24 m
4. Write $\frac{27}{36}$ in simplest form. $\frac{3}{4}$

Notes

I. The table: count, fraction, angle

Each sector's angle is its fraction of 360°.

Pet	Students	Fraction of 36	Angle
Dog	15	15/36	150°
Cat	10	10/36	100°
Fish	7	7/36	70°
Bird	4	4/36	40°

Dog: $\frac{15}{36} \cdot 360 = 15 \cdot 10 = 150$, so 150°

Notes

II. Check before you draw

The counts total the whole: every student is counted once.

$$15 + 10 + 7 + 4 = 36$$

$$150^\circ + 100^\circ + 70^\circ + 40^\circ = 360^\circ$$

The angles total 360°: one full turn.

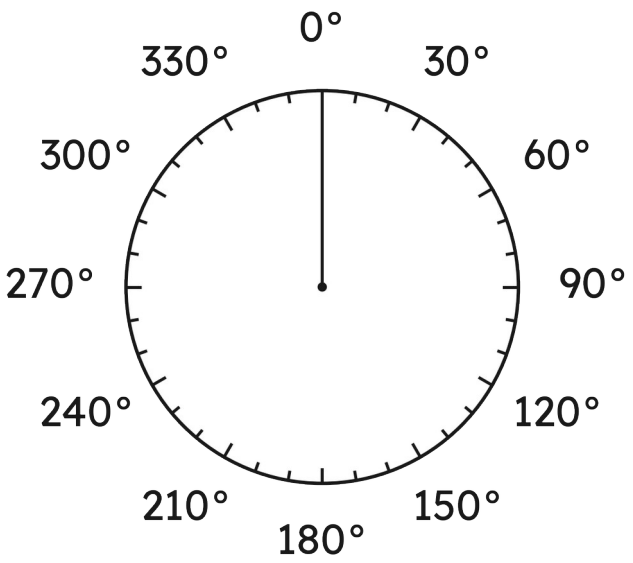
If they do not, an angle is wrong. Find it before you draw.

Notes

III. Draw: the running totals

Start at 0°, the top. Go clockwise, largest sector first.

Draw a line from the center at each running total.



Dog: 0° to 150°

Cat ends at 150° + 100° = 250°

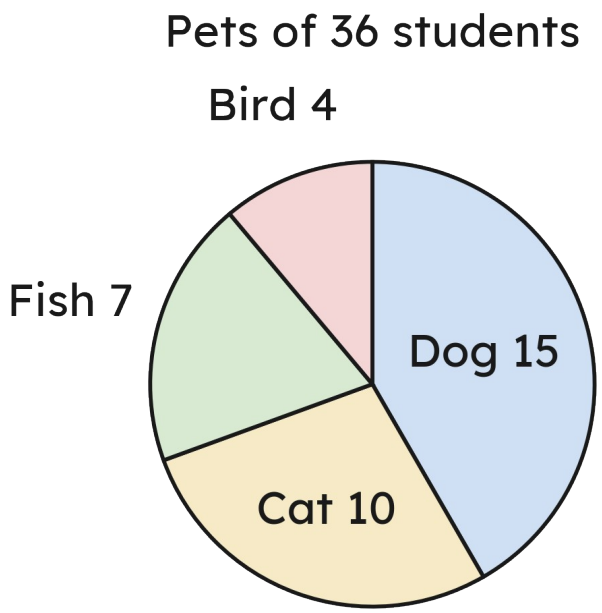
Fish ends at 250° + 70° = 320°

Bird: 320° to 360°, back at the top

Notes

IV. Label and title

Label each sector with its name and a number (here, its count). Give the graph a title.



Example 1

36 students chose a lunch: pizza 16, tacos 12 and salad 8.

Find the central angle of each sector.

Example 1

$$\frac{16}{36} \cdot 360 = 16 \cdot 10 = 160$$

$$\frac{12}{36} \cdot 360 = 12 \cdot 10 = 120$$

$$\frac{8}{36} \cdot 360 = 8 \cdot 10 = 80$$

$$160 + 120 + 80 = 360$$

Answer: Pizza 160°, Tacos 120°, Salad 80°

Your Turn

36 students chose a sport: soccer 14, track 13 and swimming 9.

Find the central angle of each sector.

Your Turn

36 students chose a sport: soccer 14, track 13 and swimming 9.

Find the central angle of each sector.

Soccer: $\frac{14}{36} \cdot 360 = 14 \cdot 10 = 140$

Track: $\frac{13}{36} \cdot 360 = 13 \cdot 10 = 130$

Swimming: $\frac{9}{36} \cdot 360 = 9 \cdot 10 = 90$

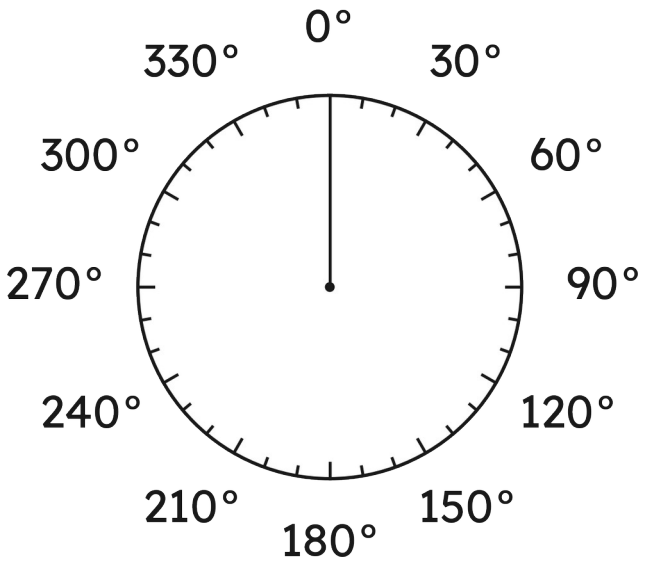
Check: $140 + 130 + 90 = 360$

Answer: Soccer 140°, Track 130°, Swimming 90°

Example 2

72 students said how they get to school:

bus 34, car 22, walk 10 and bike 6.



Find each angle, then draw the circle graph.

Example 2

$$\frac{34}{72} \cdot 360 = 34 \cdot 5 = 170 \qquad \frac{22}{72} \cdot 360 = 22 \cdot 5 = 110$$

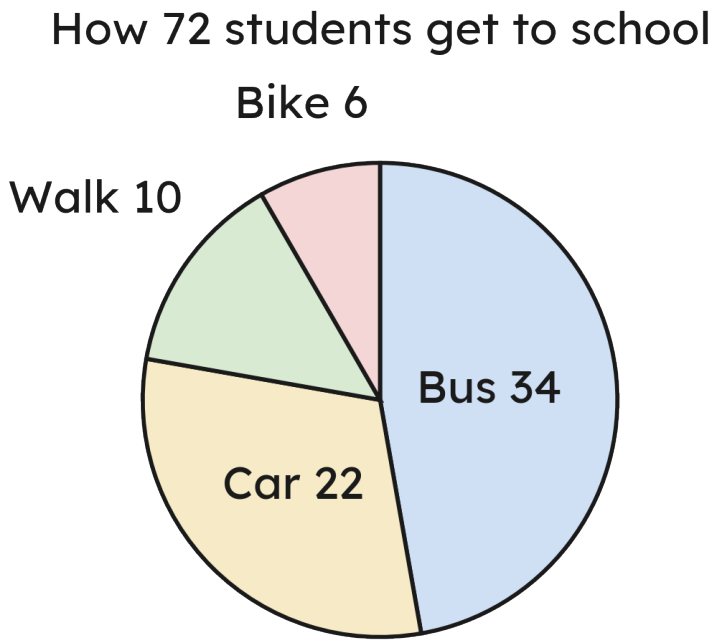
$$\frac{10}{72} \cdot 360 = 10 \cdot 5 = 50 \qquad \frac{6}{72} \cdot 360 = 6 \cdot 5 = 30$$

$$170 + 110 + 50 + 30 = 360$$

Answer: Bus 170°, Car 110°, Walk 50°, Bike 30°

Example 2

Where does each line go?



$0 + 170 = 170$

$170 + 110 = 280$

$280 + 50 = 330$

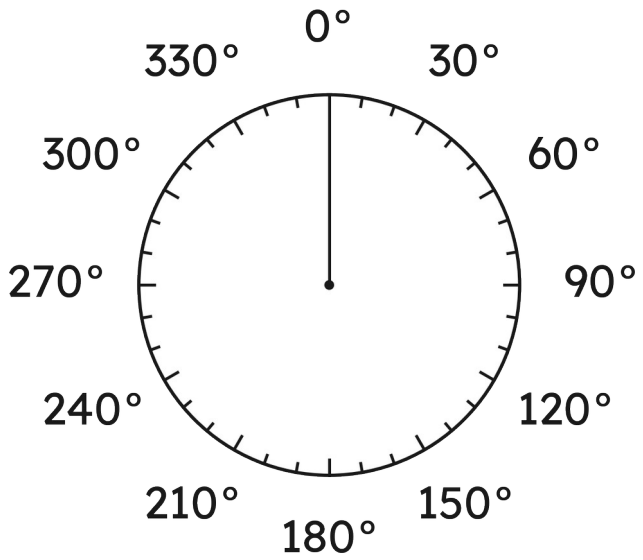
$330 + 30 = 360$

Answer: Lines at 0°, 170°, 280° and 330°

Your Turn

72 students chose a fruit: apple 28, grape 24, banana 12 and pear 8.

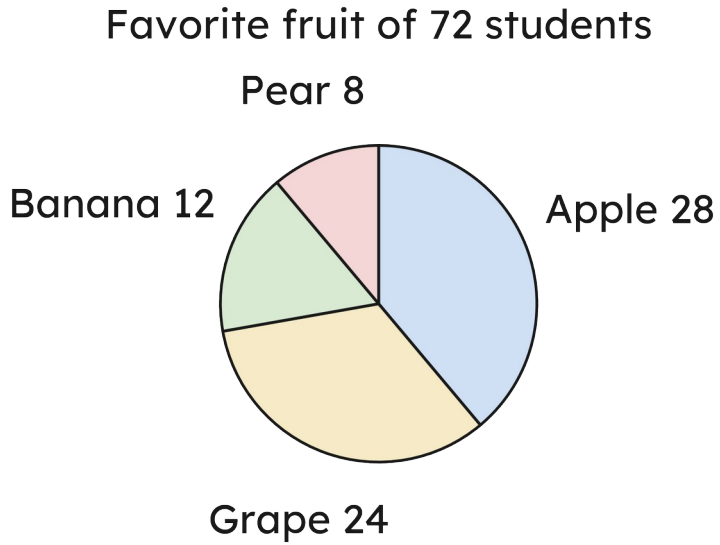
Find each angle. Then draw the graph on your circle.



Your Turn

72 students chose a fruit: apple 28, grape 24, banana 12 and pear 8.

Find each angle. Then draw the graph on your circle.



Apple: $\frac{28}{72} \cdot 360 = 28 \cdot 5 = 140$

Grape: $\frac{24}{72} \cdot 360 = 24 \cdot 5 = 120$

Banana $12 \cdot 5 = 60$, pear $8 \cdot 5 = 40$

Lines at 0°, 140°, 260° and 320°

Answer: 140°, 120°, 60°, 40°

Whiteboards · Question 1 of 9

Of 90 students, 40 chose basketball.

What fraction of the circle is the basketball sector?

A. $\frac{9}{4}$

B. $\frac{2}{5}$

C. $\frac{4}{9}$

D. $\frac{1}{9}$

Answer it.

Whiteboards · Question 1 of 9

Of 90 students, 40 chose basketball.

What fraction of the circle is the basketball sector?

Count over total: $\frac{40}{90} = \frac{4}{9}$

Answer: C — 4/9

Whiteboards · Question 2 of 9

Of 60 students, 25 ride the bus to school.

What is the central angle of the bus sector?

Answer it.

Whiteboards · Question 2 of 9

Of 60 students, 25 ride the bus to school.

What is the central angle of the bus sector?

$$\text{Bus: } \frac{25}{60} \cdot 360 = 25 \cdot 6 = 150$$

Answer: 150°

Whiteboards · Question 3 of 9

Of 36 students, 9 chose red, 8 chose blue and the rest chose green.

What is the central angle of the green sector?

A. 190°

B. 52.8°

C. 343°

D. 19°

Answer it.

Whiteboards · Question 3 of 9

Of 36 students, 9 chose red, 8 chose blue and the rest chose green.

What is the central angle of the green sector?

Green: $36 - 9 - 8 = 19$ students

$$\frac{19}{36} \cdot 360 = 19 \cdot 10 = 190$$

Answer: A — 190°

Whiteboards · Question 4 of 9

Three sectors of a circle graph are 130°, 110° and 70°.

What is the angle of the fourth sector?

Answer it.

Whiteboards · Question 4 of 9

Three sectors of a circle graph are 130°, 110° and 70°.

What is the angle of the fourth sector?

$$130 + 110 + 70 = 310$$

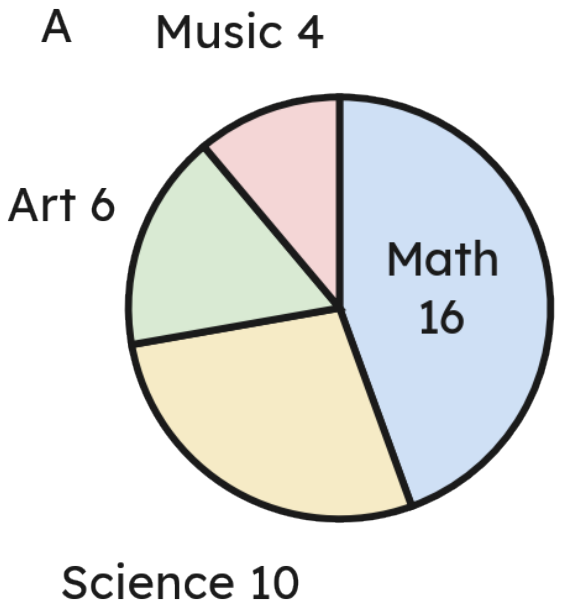
$$360 - 310 = 50$$

Answer: 50°

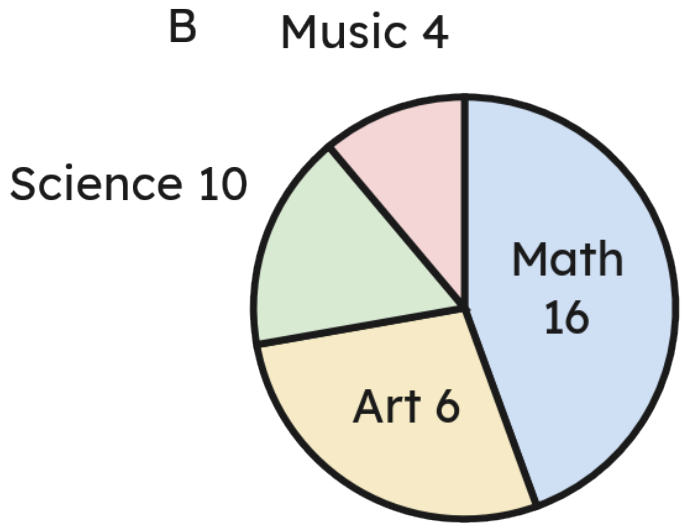
Whiteboards · Question 5 of 9

Both graphs show 36 students' counts. Which is drawn right?

A



B

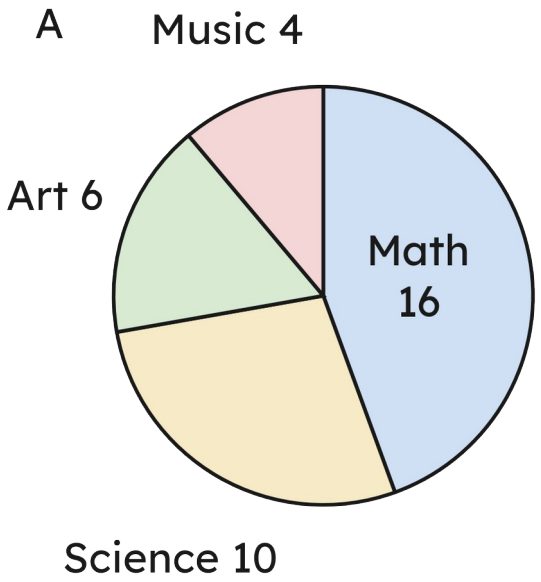


Answer it.

Whiteboards · Question 5 of 9

Both graphs show 36 students' counts. Which is drawn right?

A



Science: $\frac{10}{36} \cdot 360 = 10 \cdot 10 = 100$

Art: $\frac{6}{36} \cdot 360 = 6 \cdot 10 = 60$

Science's sector must be larger than art's.

Answer: Graph A: B swaps science and art

Whiteboards · Question 6 of 9

Of 72 students, 38 chose art, 18 chose chess and 16 chose robotics.

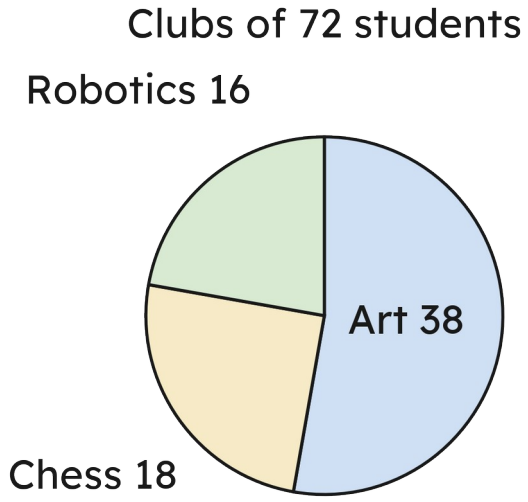
Draw the circle graph on your circle.

Answer it.

Whiteboards · Question 6 of 9

Of 72 students, 38 chose art, 18 chose chess and 16 chose robotics.

Draw the circle graph on your circle.



Art: $\frac{38}{72} \cdot 360 = 38 \cdot 5 = 190$

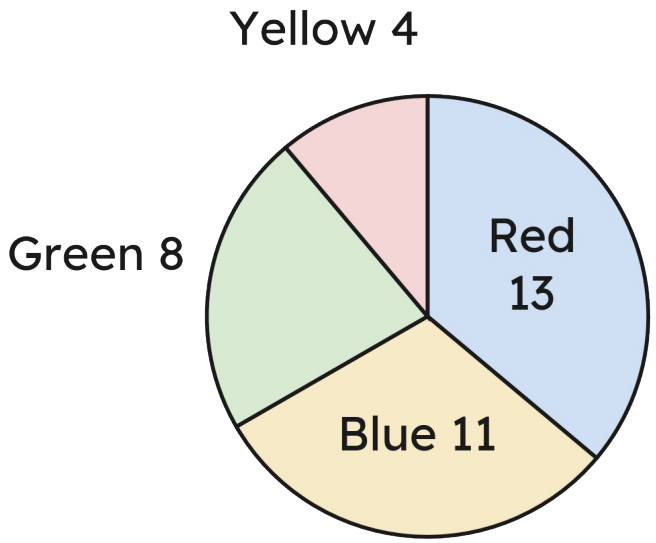
Chess: $\frac{18}{72} \cdot 360 = 18 \cdot 5 = 90$

Robotics: $\frac{16}{72} \cdot 360 = 16 \cdot 5 = 80$

Answer: 190°, 90°, 80°: lines at 0°, 190°, 280°

Whiteboards · Question 7 of 9

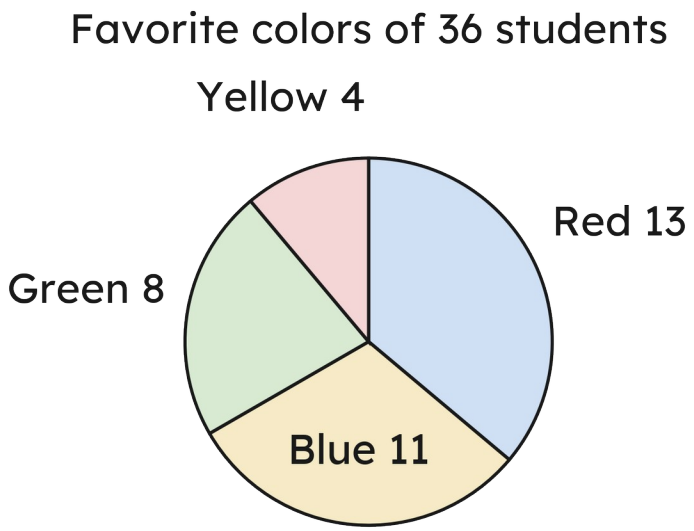
Each sector has a name and a count. What is still missing?



Answer it.

Whiteboards · Question 7 of 9

Each sector has a name and a count. What is still missing?



Names: yes. Counts: yes.

Title: none.

Answer: A title

Whiteboards · Question 8 of 9

In a 3-day survey of 90 students, 55 chose the beach for the class trip.

What is the central angle of the beach sector?

Answer it.

Whiteboards · Question 8 of 9

In a 3-day survey of 90 students, 55 chose the beach for the class trip.

What is the central angle of the beach sector?

$$\text{Beach: } \frac{55}{90} \cdot 360 = 55 \cdot 4 = 220$$

Answer: 220°

Whiteboards · Question 9 of 9

Dee's table has counts 17, 10, 6 and 3 out of 36.

Her angles are 170°, 100°, 60° and 40°.

They total 370°. What should she check, and why?

Write your answer in sentences.

Whiteboards · Question 9 of 9

Dee's table has counts 17, 10, 6 and 3 out of 36.

Her angles are 170°, 100°, 60° and 40°.

They total 370°. What should she check, and why?

The angles of a circle graph total 360°, so one is wrong.

$\frac{3}{36} \cdot 360 = 3 \cdot 10 = 30$, not 40

Check: $170 + 100 + 60 + 30 = 360$

Answer: 3 of 36 is 30°, not 40°

Independent Practice

1. Of 36 students, 5 chose art. What is the central angle of the art sector?

2. Of 72 students, 46 chose chess. What is the central angle of the chess sector?

3. Of 90 students, 20 chose soccer. What fraction of the circle is the soccer sector, in simplest form?

4. Three sectors of a circle graph are 140°, 100° and 80°. What is the angle of the fourth?

5. Can a circle graph have sectors of 120°, 110°, 90° and 30°? Explain.

6. Of 60 students, 30 chose red, 20 chose blue and 10 chose green. Find all three angles.

Before You Go

Count over total, of 360°: that is the angle.

The angles total 360° before you draw.

Tomorrow: reading amounts off a circle graph, and finding the whole from one part.

IXL

1. Open IXL and start today's skills.
2. Work on paper where the question needs work. The answer box does not show it.
3. Every skill listed is required, to a SmartScore of 60. Due by the Unit 7 test.

Today's skills — all required

Circle graphs and central angles (KXS)