Circle Graphs

Circle graphs: Applications and decisions

Name _____ **Date** _____ **Score** _____ / 6

QUICK REVIEW

A circle graph shows parts of one whole, totaling 100% and $360°$. A 25% sector has angle $0.25 \times 360 = 90°$; among 40 people it represents $0.25 \times 40 = 10$ people. Category count = percent $\times$ total, and sector angle = percent $\times 360°$. Use a protractor when drawing.

Worked example

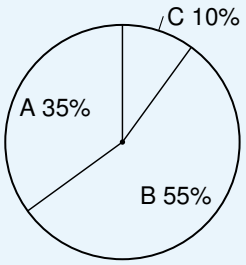
Read a three-category survey. There are 20 observations. Use the labeled graph to find each category count and sector angle.

1. The percentages total $35\% + 55\% + 10\% = 100\%$.

2. Counts: $20 \times 35/100 = 7$; $20 \times 55/100 = 11$; $20 \times 10/100 = 2$.

3. Sector angles: $360 \times 35/100 = 126°$; $360 \times 55/100 = 198°$; $360 \times 10/100 = 36°$. Counts total 20; angles total $360°$.

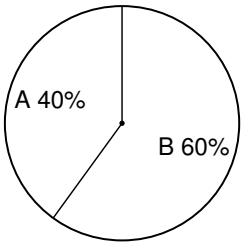
Answer: Counts A: 7, B: 11, C: 2. Angles A: $126°$, B: $198°$, C: $36°$.



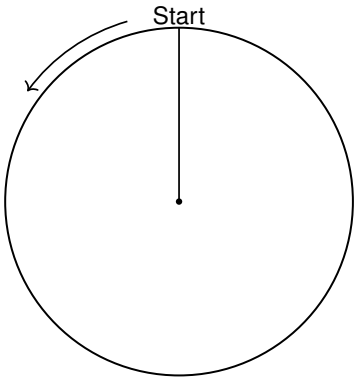
Practice Problems

Show your thinking.

1. The chart shows Club 1, with 50 members. Club 2 has 80 members, and 30% chose A. Which club has the larger A slice? Which has more members choosing A?



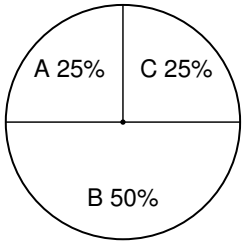
2. There are 40 votes. A gets 12 votes, and B gets 4 more than C. Recover B and C. From the top ray, draw and label A, B, C in counterclockwise order.



3. Art takes $150°$ in a school circle graph. Drawing and painting have ratio $2 : 3$. Find the two subgroup angles and painting as a fraction of the full graph.

4. All 50 students walk or ride to school at least once a week. 30 walk, 28 ride, and 8 do both. A chart uses only Walk and Ride slices with those counts. Explain the mistake and give three nonoverlapping counts.

5. The graph shows 40 votes. Then 10 new votes all go to A. A now has twice as many votes. Did its angle double? Find the old and new angles.



6. An exact chart has shares $25\%, 25\%, 50\%$. Could it represent 18 indivisible ballots? Find the smallest ballot total at least 18 that fits these shares.

Answer Key

1. Club 1 has the larger share; Club 2 has more A members (24 versus 20).
2. A: 12 votes ($108°$); B: 16 ($144°$); C: 12 ($108°$).
3. Drawing $60°$; painting $90°$, or $1/4$ of the whole.
4. The chart double-counts 8. Use walk only 22, ride only 20, and both 8.
5. No. A changes from $90°$ to $144°$, an increase of $54°$.
6. Not 18. The smallest valid total is 20, with counts $5, 5, 10$.

Step-by-Step Solutions

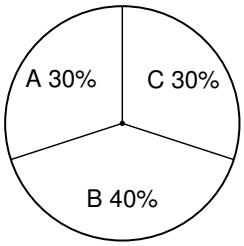
Follow each calculation, then check your own work.

Problem 1

1. Club 1 has 40% choosing A. Since $40\% > 30\%$, Club 1 has the larger slice.
2. Club 1: $50(40/100) = 20$. Club 2: $80(30/100) = 24$. The smaller slice represents more people because its whole is bigger.

Problem 2

1. B and C share $40 - 12 = 28$ votes. Give B its extra 4 first. Split the remaining 24: C gets $24/2 = 12$, and B gets $12 + 4 = 16$.
2. A and C each take $12/40 = 30\%$, or $108°$. B takes $16/40 = 40\%$, or $144°$.
3. Start at the top ray. Mark boundaries at $108°$ and $108° + 144° = 252°$ counterclockwise.



Problem 3

1. The ratio has $2 + 3 = 5$ parts, so each takes $150°/5 = 30°$.
2. Drawing uses $2(30°) = 60°$; painting uses $3(30°) = 90°$.
3. Compare painting to the full circle: $90/360 = 1/4$.

Problem 4

1. The proposed slices count $30 + 28 = 58$ memberships for only 50 students.
2. Put the 8 who do both in their own group. Walk only $= 30 - 8 = 22$; ride only $= 28 - 8 = 20$.
3. Check $22 + 20 + 8 = 50$. Each student now belongs to one slice.

Problem 5

1. Originally A has 25% of 40, or 10 votes. Its angle is $360(1/4) = 90°$.
2. Now A has 20 of 50. Its new angle is $360(20/50) = 144°$.
3. Double $90°$ is $180°$. The actual increase is $144° - 90° = 54°$ because the whole also grew.

Problem 6

1. A quarter of 18 is $18/4 = 4.5$ ballots; a ballot cannot be split.
2. The total must be a multiple of 4. Both 18 and 19 fail. The next multiple is 20.
3. Check: $20/4 = 5$ in each quarter, and $20/2 = 10$ in the half.

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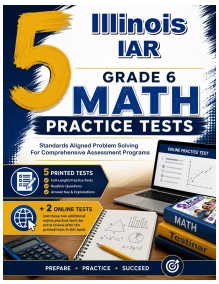

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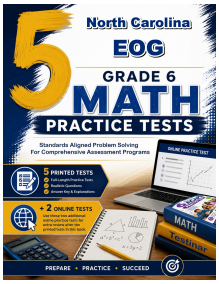

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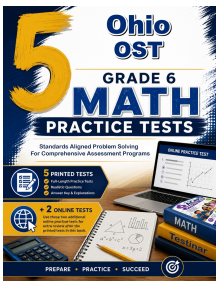

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