

Circle Model Lab

Use simple models, then connect them to pi.

GRADE 7 • TEKS 7.8.C

7.8.C "use models to determine the approximate formulas for the circumference and area of a circle and connect the models to the actual formulas."

NAME _____

DATE _____

FROM MODELS TO FORMULAS

A circumference model shows that the distance around a circle is a little more than 3 diameters, so C is about $3d$. An area model made from circle pieces is about 3 groups of $r \times r$, so A is about $3r^2$. The actual formulas use pi: $C = \pi d$, or $C = 2\pi r$, and $A = \pi r^2$. Since pi is about 3.14, the actual value is usually a little greater than the model value.

WORKED EXAMPLE

A circle has a diameter of 18 cm.
Use the circumference model and the actual formula.

1. Model: C is about $3d$.
2. C is about 3×18 .
3. C is about 54 cm.
4. Actual formula: $C = \pi \times 18 = 18\pi$ cm, about 56.52 cm.

Answer: Model: about 54 cm. Actual: 18pi cm, about 56.52 cm.

PRACTICE 6 problems

- 1** A circle has a diameter of 8 cm. Use C is about $3d$ to estimate its circumference.

ANSWER _____

- 2** A circle has a radius of 4 cm. Use A is about $3r^2$ to estimate its area.

ANSWER _____

- 3** A circle has a diameter of 16 cm. Find its model circumference and its actual circumference. Use 3.14 for pi when estimating.

ANSWER _____

- 4** A circle has a radius of 6 cm. Find its model area and its actual area. Use 3.14 for pi when estimating.

ANSWER _____

- 5** A circle's circumference model is about 30 cm. What is the circle's estimated diameter?

ANSWER _____

- 6** A circle's area model is about 75 square cm. What is the circle's estimated radius?

ANSWER _____

APPLY IT Show your work

- 1** A student is ordering a circular sticker for a laptop. The sticker has a diameter of 20 cm. Estimate the length of trim needed around the edge using the model. Then find the circumference using $\pi = 3.14$.

WORK SPACE

ANSWER _____

- 2** A school game club wants a circular table mat with a radius of 8 cm. Estimate the area using the model. Then find the area using $\pi = 3.14$.

WORK SPACE

ANSWER _____

CHALLENGE One step up

A circle has a diameter of 14 cm. Find its model circumference and area. Then find its circumference and area using $\pi = 3.14$. Explain why both values found with π are greater than the model values.

WORK SPACE AND ANSWER

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	A circle has a diameter of 8 cm. Use C is about $3d$ to estimate its circumference.	About 24 cm
2	A circle has a radius of 4 cm. Use A is about $3r^2$ to estimate its area.	About 48 square cm
3	A circle has a diameter of 16 cm. Find its model circumference and its actual circumference. Use 3.14 for π when estimating.	Model: about 48 cm. Actual: 16π cm, about 50.24 cm
4	A circle has a radius of 6 cm. Find its model area and its actual area. Use 3.14 for π when estimating.	Model: about 108 square cm. Actual: 36π square cm, about 113.04 square cm
5	A circle's circumference model is about 30 cm. What is the circle's estimated diameter?	About 10 cm
6	A circle's area model is about 75 square cm. What is the circle's estimated radius?	About 5 cm

PART 2 • APPLY IT

1. **Model: about 60 cm. Using π : 62.8 cm.** Use C is about $3d$: $3 \times 20 = 60$. Use $C = \pi d$: $3.14 \times 20 = 62.8$.
2. **Model: about 192 square cm. Using π : 200.96 square cm.** Use A is about $3r^2$: $3 \times 8 \times 8 = 192$. Use $A = \pi r^2$: $3.14 \times 8 \times 8 = 200.96$.

CHALLENGE

Model circumference: about 42 cm. Model area: about 147 square cm. Using π , circumference: 43.96 cm and area: 153.86 square cm. Both π values are greater because π is about 3.14, which is greater than 3.

Accept equivalent exact forms such as 16π cm or $\pi \times 16$ cm. For estimates, accept correct units and values labeled as approximate.