

Grade 8 Mathematics Worksheet

Measurement

Questions:

1. You have a 100 m length of fencing to make an enclosed pen for my dog in the backyard. I can make a circle with circumference 100 m, a square with a perimeter of 100 m, or a rectangle with width 6 m to make a long pen so he can run up and down. Which pen gives him the most area?
2. Below is the menu for Pizza Place. The school newspaper is doing an article on the popular hangout. The article questions whether the owner is setting prices fairly for pizza.
 - i) Do you think the prices are fair? Use your knowledge of circles and your reasoning skills to support or refute the fairness of the pricing of different sized pizzas.

	Pizza Place Menu (pizza sizes in terms of diameter)		
	6cm pizza	12cm pizza	18cm pizza
1 topping	R3.99	R8.00	R16.00

- ii) Scaffolding questions may include:
 - What affects how much topping is needed for a pizza?
 - What do you notice about the pizzas offered at the Pizza place?
 - How are the area and diameter related? What will you discover while solving this problem?
 - What will you need to do in order to report accurate findings? Investigate circles that represent pizzas and see how doubling (tripling, etc) the diameter affects the area.
 - What are some possible sets of circles that match the growth of the advertised pizzas?

Learners will be given a scenario regarding prices charged for pizzas at a local pizza place. They will determine whether or not the prices charged are appropriate and then justify their conclusions. To do this, they will investigate circles and their areas. They will use this information to justify whether the prices charged by the pizza place are reasonable.

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Solution

1. Circular pen: Circumference – $100 \text{ m} = 2\pi r \approx 6.3r$

$$r \approx \frac{100}{6.3} \approx 15.9 \text{ m}$$

$$\text{Area} = \pi (15.9)^2 \approx 793.8 \text{ m}^2$$

Square pen: Perimeter = $100 \text{ m} = 4 \cdot \text{side length}$

$$\text{Side length} = \frac{100}{4} \text{ m} = 25 \text{ m}$$

$$\text{Area} = \text{length} \cdot \text{width} = 25 \cdot 25 = 625 \text{ m}^2$$

Rectangular pen: Width = 6 m

Perimeter = 100 m

$$100 \text{ m} = 2(\text{length} + \text{width})$$

$$\frac{100}{2} \text{ m} = (\text{length} + \text{width})$$

$$50 \text{ m} = \text{length} + 6$$

$$44 \text{ m} = \text{length}$$

$$\text{Area} = \text{length} \cdot \text{width} = 44 \cdot 6 = 264 \text{ m}^2$$

Area comparisons: The circular pen gives the most area

Circular pen	Square Pen	Rectangular Pen
793.8 m^2	625 m^2	264 m^2
Largest Area		

2. ii)
- The area of the top side of the pizza.
 - 1 topping; size of diameter grows proportionally.
 - Learners may not be sure. That is what they will discover while solving this problem.
 - They should find that when the diameter (or any linear measurement of a circle) grows proportionally the area of the circle increases by the square of the rate of change of the proportional relationship.
 - Learners may offer circles with 2 cm , 4 cm , and 6 cm diameters or 3 cm , 6 cm and 9 cm etc. Learners may notice that, if they are applying the formula for area of a circle it will be a simpler problem if they choose a set of circles that all have even diameters.

Both activities can be used as a long assessment task assessing different aspects skills. Use the mathematical tools to design a rubric for assessment purposes.