Math by Design
Flossville Town Park Tasks and Subtasks Answer Key

Alley Oops!
To attract the young folks, Mayor Barnum wants to be sure to have the right equipment for skateboarders to enjoy. Including a rail and a ramp is sure to be a hit!

Alley Oops! Subtask 1: Place the ramp in the skateboard area.
Think about:
>   The entire ramp covers a rectangular area 60 meters long and 10 meters wide.
>   Be sure to leave space around all sides of the ramp.

Accepted Answers: Student sizes the rectangle to cover an area 6 units long and 1 unit wide and places it near the top of the skateboard area. There should be at least one unit on each side and it should not be against the edge of the skateboard area at the top. It also should be at least one unit above the rail that is already in the skateboard area. There are several accepted placements; the ramp will snap to a specific placement used for the 3-D view.

Length of ramp:

$$\frac{1 \text{ unit}}{10 \text{ meters}} = \frac{n \text{ units}}{60 \text{ meters}}$$
$$60 = 10n$$
$$6 = n$$

Width of ramp:

$$\frac{1 \text{ unit}}{10 \text{ meters}} = \frac{n \text{ units}}{10 \text{ meters}}$$
$$10 = 10n$$
$$1 = n$$

The ramp is 6 units long and 1 unit wide.

**Alley Oops! Subtask 2: Cover the ramp surface with waterproof material.**
Think about:
>   The ramp has a flat middle section that is 0.5 m above the ground and 20 meters long.
>   Each end of the flat middle section joins an inclined section running down to the ground.
>   These inclined sections both have the same dimensions.
>   Calculate the lengths of these inclined sections before calculating the area.
>   You may get the measurements from the side view window. (Round the lengths to the nearest hundredth of a meter.)

Side view:

0.5 m
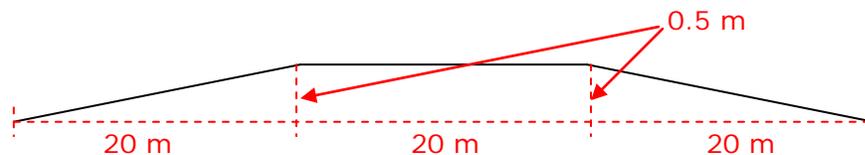
20 m   20 m   20 m

Accepted Answers: 600.2 square meters or 600.20 square meters
Length of one incline:

$$(0.5)^2 + 20^2 = h^2$$
$$0.25 + 400 = h^2$$
$$400.25 = h^2$$
$$20.01 \approx h$$

Area of ramp:

$A = 2(\text{area of inclined section}) + (\text{area of flat section})$

$A = 2(20.01 \text{ m})(10 \text{ m}) + (20 \text{ m})(10 \text{ m})$

$A = 600.2 \text{ m}^2$

Alley Oops! Subtask 3: Move the skateboarder along the rail.
Think About:
  The skateboarder must travel along the rail from one end to the other, moving from left to right.
  The point with coordinates (0, 0) is at the lower left corner of the skateboard area.
Accepted Answers: (3, 1) then (4, 1) then (6, 2) then (7, 2)