

TAKS PROBLEMS ON CHANGES IN PERIMETER, AREA, OR VOLUME

Below are examples of problems in multiple choice format that involve changes in perimeter, area, or volume. Try solving the problems before looking at the solutions. (Cover the solutions with a piece of paper.) Then check your solutions against the ones given.

1. If the surface area of a sphere is increased by a factor of 9, what is the change in the radius of the sphere?
- A** The new radius is 3 times the original radius.
 - B** The new radius is 6 times the original radius.
 - C** The new radius is 9 times the original radius.
 - D** The new radius is 81 times the original radius.

Solution

Set up a proportion.

$$\frac{\text{Surface area of original sphere}}{\text{Surface area of new sphere}} = \frac{a^2}{b^2}$$

$$\frac{1}{9} = \frac{a^2}{b^2}$$

$$\frac{1}{3} = \frac{a}{b}$$

The ratio of the radii is $\frac{1}{3}$.

So, the new radius is 3 times the original radius.

The correct answer is A.

(A) **(B)** **(C)** **(D)**

2. The perimeter of a rectangle is 58 centimeters. If the length and width are both changed to $\frac{1}{2}$ their original size, what will be the perimeter of the new rectangle?
- F** 14.5 cm
 - G** 29 cm
 - H** 87 cm
 - J** 116 cm

Solution

The length and width of the new rectangle are one half that of the original rectangle, so the scale factor is 2:1.

Set up a proportion.

$$\frac{\text{Perimeter of original rectangle}}{\text{Perimeter of new rectangle}} = \frac{a}{b}$$

$$\frac{58}{\text{Perimeter of new rectangle}} = \frac{2}{1}$$

$$2(\text{Perimeter of new rectangle}) = 58$$

$$\text{Perimeter of new rectangle} = 29$$

So, the perimeter of the new rectangle is 29 centimeters.

The correct answer is G.

(F) **(G)** **(H)** **(J)**