G.G.12: Know and apply that the volume of a prism is the product of the area of the base and the altitude

1. 060103a, P.I. G.G.12
If the length of a rectangular prism is doubled, its width is tripled, and its height remains the same, what is the volume of the new rectangular prism?

[A] six times the original volume

[B] nine times the original volume

[C] double the original volume

[D] triple the original volume

2. 060427a, P.I. G.G.12
A box in the shape of a cube has a volume of 64 cubic inches. What is the length of a side of the box?

[A] 8 in [B] 16 in

[C] $21.\overline{3}$ in [D] 4 in

3. 010324a, P.I. G.G.12
A fish tank with a rectangular base has a volume of 3,360 cubic inches. The length and width of the tank are 14 inches and 12 inches, respectively. Find the height, in inches, of the tank.

4. fall0815ge, P.I. G.G.12
A rectangular prism has a volume of $3x^2 + 18x + 24$. Its base has a length of $x + 2$ and a width of 3. Which expression represents the height of the prism?

[A] $x^2 + 6x + 8$ [B] $x + 2$

[C] 3 [D] $x + 4$

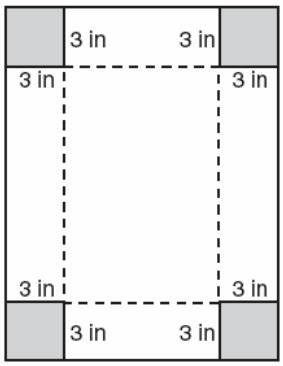
5. 010030a, P.I. G.G.12
The volume of a rectangular pool is 1,080 cubic meters. Its length, width, and depth are in the ratio 10:4:1. Find the number of meters in each of the three dimensions of the pool.

6. 010711a, P.I. G.G.12
A planned building was going to be 100 feet long, 75 feet deep, and 30 feet high. The owner decides to increase the volume of the building by 10% without changing the dimensions of the depth and the height. What will be the new length of this building?

[A] 112 ft [B] 106 ft

[C] 108 ft [D] 110 ft

7. 060331a, P.I. G.G.12
Deborah built a box by cutting 3-inch squares from the corners of a rectangular sheet of cardboard, as shown in the accompanying diagram, and then folding the sides up. The volume of the box is 150 cubic inches, and the longer side of the box is 5 inches more than the shorter side. Find the number of inches in the shorter side of the *original* sheet of cardboard.



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[1] A

[2] D

[2] 20, and appropriate work is shown, such as $3{,}360 \div (14 \times 12)$.
[1] Appropriate work is shown, but one computational error is made.
or [1] 20, but no work is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously
[3] incorrect procedure.

[4] D

[3] 3, 12, and 30 and an appropriate arithmetic method or equation is shown, such as $40x^3 = 1080$.
[2] An appropriate equation or method is shown, but not all three dimensions are found.
or [2] An appropriate method is shown, and although one computational mistake is made, the student does find three dimensions based on this mistake, such as dividing 1080 by 40 incorrectly.
[1] The student shows that multiplication is required to find volume but sets up an incorrect method and does not find three dimensions.
or [1] 3, 12, and 30 and no work is shown.
[0] The sum is used instead of the product,
or [0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an
[5] obviously incorrect procedure.

[6] D

[4] 11, and appropriate work is shown, such as solving the quadratic equation $3x(x+5) = 150$ or trial and error with at least three trials and appropriate checks.
[3] Appropriate work is shown, but one computational error is made.
or [3] Appropriate work is shown to determine that 5 is the shorter side of the box, but the shorter side of the original sheet is not found or is found incorrectly.
or [3] An incorrect quadratic equation of equal difficulty is solved appropriately, and an appropriate shorter side of the original sheet is found.
[2] Appropriate work is shown, but more than one computational error is made.
or [2] Appropriate work is shown, but one conceptual error is made.
or [2] An incorrect quadratic equation of equal difficulty is solved appropriately, but the shorter side of the original sheet is not found.
or [2] A correct quadratic equation is set equal to zero, but no further correct work is shown.
or [2] The trial-and-error method is used to find a correct solution, but only two trials and appropriate checks are shown.
[1] Appropriate work is shown, but one conceptual error and one computational error are made.
or [1] One conceptual error is made in finding the shorter side of the box, and the corresponding shorter side of the original sheet is not found or is found incorrectly.
or [1] A correct quadratic equation is written, but it is not set equal to zero, and no further correct work is shown.
or [1] 11, but no work or only one trial with an appropriate check is shown.
[0] A zero response is completely incorrect, irrelevant, or incoherent or is a correct response that was obtained by an obviously
[7] incorrect procedure.