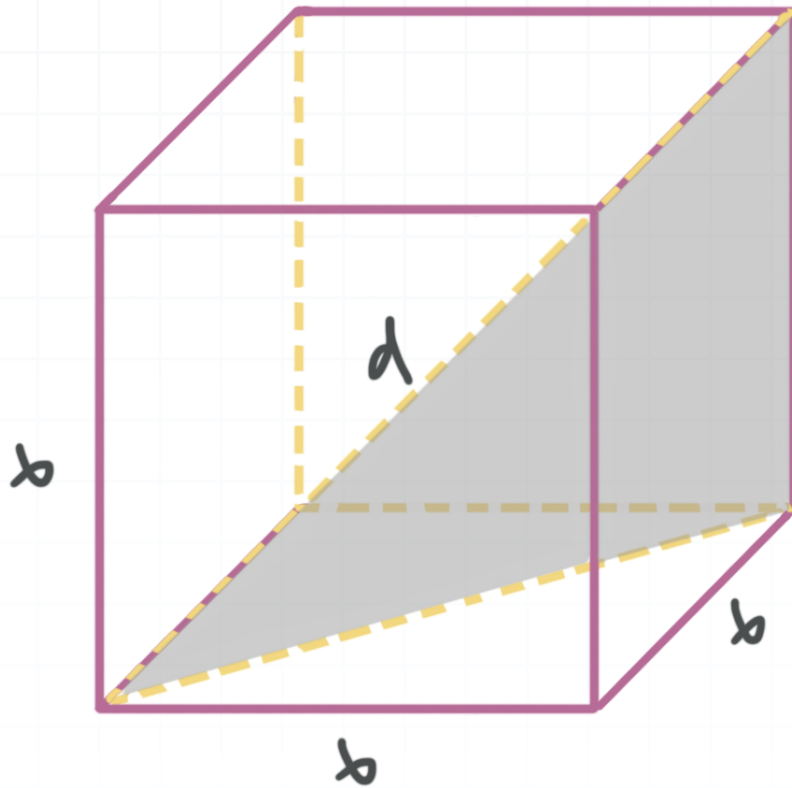


Topic: Diagonal of a right rectangular prism**Question:** What is the length of the diagonal of the cube?**Answer choices:**

- A 36
- B $6\sqrt{2}$
- C 108
- D $6\sqrt{3}$



Solution: D

Plugging the dimensions we've been given into the formula for the diagonal, we get

$$d = \sqrt{l^2 + w^2 + h^2}$$

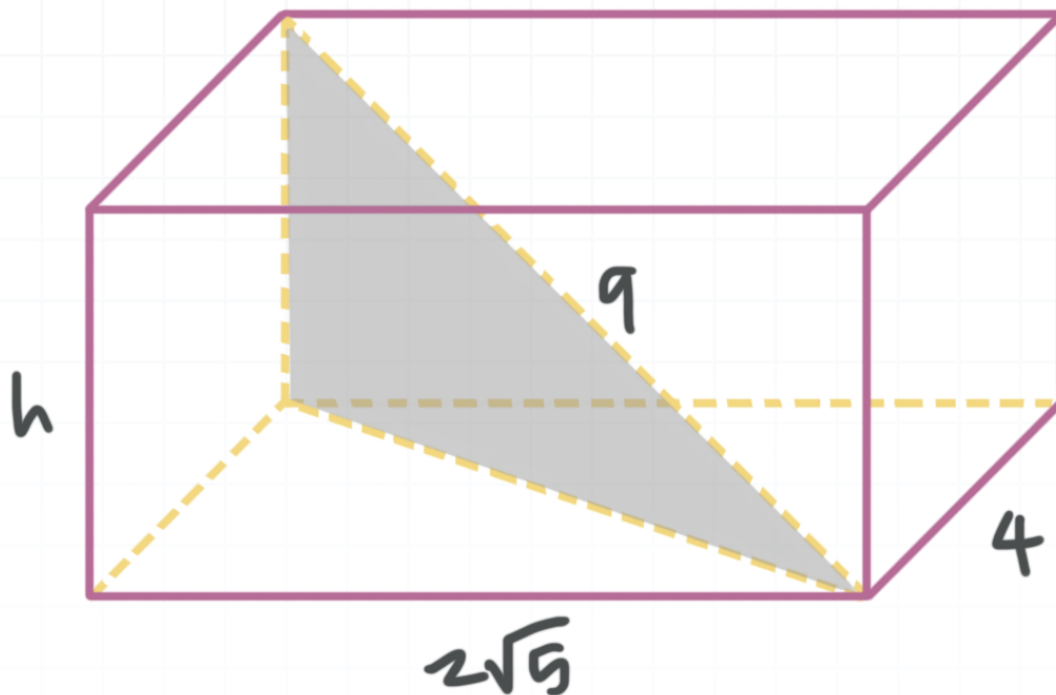
$$d = \sqrt{6^2 + 6^2 + 6^2}$$

$$d = \sqrt{36 + 36 + 36}$$

$$d = \sqrt{36 \cdot 3}$$

$$d = 6\sqrt{3}$$



Topic: Diagonal of a right rectangular prism**Question:** What is the height of the right rectangular prism?**Answer choices:**

- A $5\sqrt{2}$
- B $3\sqrt{5}$
- C $2\sqrt{6}$
- D $6\sqrt{2}$



Solution: B

Plugging the dimensions we've been given into the formula for the diagonal, we get

$$d = \sqrt{l^2 + w^2 + h^2}$$

$$9 = \sqrt{(2\sqrt{5})^2 + 4^2 + h^2}$$

$$9 = \sqrt{4(5) + 4^2 + h^2}$$

$$9 = \sqrt{20 + 16 + h^2}$$

$$9 = \sqrt{36 + h^2}$$

Square both sides.

$$81 = 36 + h^2$$

$$h^2 = 45$$

$$h^2 = 9 \cdot 5$$

$$h = \pm 3\sqrt{5}$$

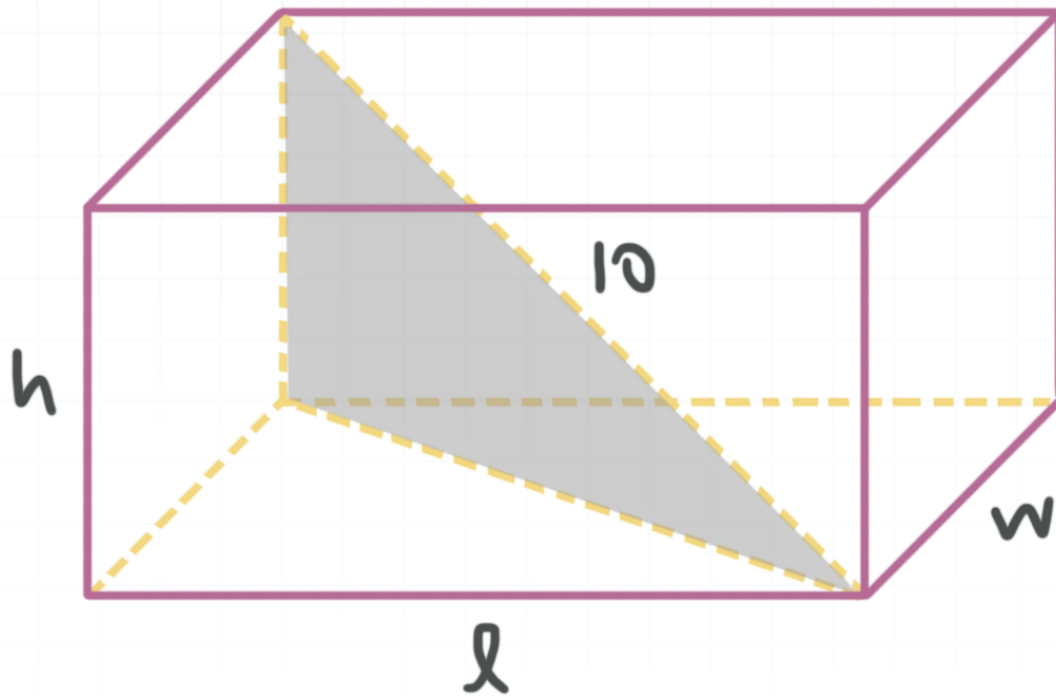
Ruling out the negative value for h leaves us with

$$h = 3\sqrt{5}$$



Topic: Diagonal of a right rectangular prism

Question: In this right rectangular prism with a diagonal of 10, which dimensions of $l \times w \times h$ could not be correct?

**Answer choices:**

- A $l = 2\sqrt{6}, w = 2\sqrt{10}, h = 6$
- B $l = 5\sqrt{2}, w = 4\sqrt{2}, h = 3\sqrt{2}$
- C $l = 3\sqrt{5}, w = 2\sqrt{6}, h = 4\sqrt{2}$
- D $l = 8, w = 4, h = 2\sqrt{5}$



Solution: C

We'll try each of the answer choices in the formula for the diagonal of a right rectangular prism,

$$d = \sqrt{l^2 + w^2 + h^2}$$

For answer choice A:

$$d = \sqrt{(2\sqrt{6})^2 + (2\sqrt{10})^2 + 6^2}$$

$$d = \sqrt{(4 \cdot 6) + (4 \cdot 10) + 36}$$

$$d = \sqrt{24 + 40 + 36}$$

$$d = \sqrt{100}$$

$$d = 10$$

For answer choice B:

$$d = \sqrt{(5\sqrt{2})^2 + (4\sqrt{2})^2 + (3\sqrt{2})^2}$$

$$d = \sqrt{(25 \cdot 2) + (16 \cdot 2) + (9 \cdot 2)}$$

$$d = \sqrt{50 + 32 + 18}$$

$$d = \sqrt{100}$$

$$d = 10$$

For answer choice C:



$$d = \sqrt{(3\sqrt{5})^2 + (2\sqrt{6})^2 + (4\sqrt{2})^2}$$

$$d = \sqrt{(9 \cdot 5) + (4 \cdot 6) + (16 \cdot 2)}$$

$$d = \sqrt{45 + 24 + 32}$$

$$d = \sqrt{101}$$

For answer choice D:

$$d = \sqrt{8^2 + 4^2 + (2\sqrt{5})^2}$$

$$d = \sqrt{64 + 16 + (4 \cdot 5)}$$

$$d = \sqrt{64 + 16 + 20}$$

$$d = \sqrt{100}$$

$$d = 10$$

Answer choice C is the only answer choice that doesn't come out to 10 as the value for the diagonal.

