Math 109 P Section 2 Quiz 7 B

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Solutions

(1) Find each square root.

(a) $\sqrt{-16}$ (b) $\sqrt{\frac{81}{49}}$ (c) $\sqrt{25a^2}$ (d) $\sqrt{x^2+4x+4}$

Solutions.

(a) $\sqrt{-16}$ is NOT a real number. No real number gives -16 when squared.

(b) $\sqrt{\frac{81}{49}} = \frac{\sqrt{81}}{\sqrt{49}} = \frac{9}{7}$.

(c) $\sqrt{25a^2} = \sqrt{25} \cdot \sqrt{a^2} = 5 \mid a \mid$.

(d) $\sqrt{x^2+4x+4} = \sqrt{(x+2)^2} = \mid x+2 \mid$.

(2) Find each cubic root .

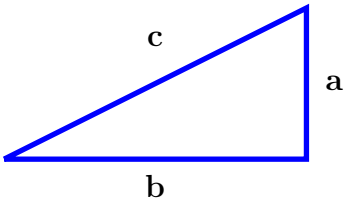
(a) $\sqrt[3]{-27}$ (b) $\sqrt[3]{27b^3}$

Solutions.

(a) $\sqrt[3]{-27} = -3$.

(b) $\sqrt[3]{27b^3} = \sqrt[3]{27} \cdot \sqrt[3]{b^3} = 3b$.

(3) The lengths of two sides of the right triangle ABC shown in the illustration are given: $b = 7$ cm and $c = 25$ cm . Find the length of the missing side a .



Solutions.

We use Pythagoras Theorem: if a and b are the legs of the right triangle and c is the hypothenuse, then

$$c^2 = a^2 + b^2 \quad .$$

In our case, a is unknown, so we solve for a :

$$25^2 = a^2 + 7^2 \Rightarrow a^2 = 25^2 - 7^2 = 625 - 49 = 576 \Rightarrow \sqrt{a^2} = \sqrt{576} \Rightarrow a = 24 \quad .$$

So, the second leg is 24 cm. ■

(4) Find the distance between the points $(6, 8)$ and $(12, 16)$.

Solutions.

The distance between two points (x_1, y_1) and (x_2, y_2) is given by the formula:

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} \quad .$$

In our case, $(x_1, y_1) = (6, 8)$ and $(x_2, y_2) = (12, 16)$, so

$$d = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2} = \sqrt{(12 - 6)^2 + (16 - 8)^2} = \sqrt{6^2 + 8^2} = \sqrt{36 + 64} = \sqrt{100} = 10 \ . \ ■$$