

Topic: Rationalize the denominator with conjugate method

Question: Simplify the expression.

$$\frac{3 - \sqrt{6}}{\sqrt{6} - 2}$$

Answer choices:

A $\frac{-\sqrt{6}}{2}$

B $\sqrt{3}$

C $\frac{\sqrt{6}}{-2}$

D $\frac{\sqrt{6}}{2}$



Solution: D

We want to use conjugate method to get the radical out of the denominator. Remember that the conjugate of two terms is just the same two terms with the opposite sign in between the terms. So the conjugate of $\sqrt{6} - 2$ is $\sqrt{6} + 2$. This is the value we need to multiply by both the numerator and denominator.

$$\frac{3 - \sqrt{6}}{\sqrt{6} - 2}$$

$$\frac{3 - \sqrt{6}}{\sqrt{6} - 2} \cdot \frac{\sqrt{6} + 2}{\sqrt{6} + 2}$$

Now this becomes a binomial multiplication problem. We need to make sure to multiply our first terms, outer terms, inner terms, and last terms.

$$\frac{(3 - \sqrt{6})(\sqrt{6} + 2)}{(\sqrt{6} - 2)(\sqrt{6} + 2)}$$

$$\frac{3\sqrt{6} + 6 - 6 - 2\sqrt{6}}{6 + 2\sqrt{6} - 2\sqrt{6} - 4}$$

$$\frac{3\sqrt{6} - 2\sqrt{6}}{6 - 4}$$

$$\frac{\sqrt{6}}{2}$$



Topic: Rationalize the denominator with conjugate method

Question: Simplify the expression.

$$\frac{2 - \sqrt{3}}{\sqrt{3} - 1}$$

Answer choices:

A $\frac{\sqrt{3} - 1}{2}$

B $\frac{-\sqrt{3} + 1}{2}$

C $\frac{\sqrt{3} + 1}{2}$

D $\frac{\sqrt{3} + 1}{-2}$



Solution: A

We want to use conjugate method to get the radical out of the denominator. Remember that the conjugate of two terms is just the same two terms with the opposite sign in between the terms. So the conjugate of $\sqrt{3} - 1$ is $\sqrt{3} + 1$. This is the value we need to multiply by both the numerator and denominator.

$$\frac{2 - \sqrt{3}}{\sqrt{3} - 1}$$

$$\frac{2 - \sqrt{3}}{\sqrt{3} - 1} \cdot \frac{\sqrt{3} + 1}{\sqrt{3} + 1}$$

Now this becomes a binomial multiplication problem. We need to make sure to multiply our first terms, outer terms, inner terms, and last terms.

$$\frac{(2 - \sqrt{3})(\sqrt{3} + 1)}{(\sqrt{3} - 1)(\sqrt{3} + 1)}$$

$$\frac{2\sqrt{3} + 2 - 3 - \sqrt{3}}{3 + \sqrt{3} - \sqrt{3} - 1}$$

$$\frac{2\sqrt{3} - 1 - \sqrt{3}}{3 - 1}$$

$$\frac{\sqrt{3} - 1}{2}$$



Topic: Rationalize the denominator with conjugate method

Question: Rationalize the denominator.

$$\frac{13}{4 - \sqrt{3}}$$

Answer choices:

A $4 - \sqrt{3}$

B $4 + \sqrt{3}$

C $\frac{13(4 + \sqrt{3})}{19}$

D $\frac{52 + \sqrt{3}}{13}$



Solution: B

To rationalize the denominator of

$$\frac{13}{4 - \sqrt{3}}$$

we'll multiply both the numerator and denominator by the conjugate of the denominator.

$$\frac{13}{4 - \sqrt{3}} \cdot \frac{4 + \sqrt{3}}{4 + \sqrt{3}}$$

$$\frac{13(4 + \sqrt{3})}{16 - 4\sqrt{3} + 4\sqrt{3} - 3}$$

$$\frac{13(4 + \sqrt{3})}{13}$$

Cancel 13 to get

$$4 + \sqrt{3}$$

