

**Topic:** Rationalizing 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 a binomial has the same two terms but with the opposite sign between them. So the conjugate of  $\sqrt{6} - 2$  is  $\sqrt{6} + 2$ . This is the binomial that both the numerator and denominator have to be multiplied by.

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

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

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:** Rationalizing 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 a binomial has the same two terms but with the opposite sign between them. So the conjugate of  $\sqrt{3} - 1$  is  $\sqrt{3} + 1$ . This is the binomial that both the numerator and denominator have to be multiplied by.

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

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

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:** Rationalizing 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 the 13's to get

$$4 + \sqrt{3}$$

