

ALGEBRA: Multiplication of Algebraic Expressions (Sample Problems & Solutions) - Part 006

1. Find the product of the following algebraic expressions:
 $(3\sqrt{2}x^2 - 1)$ and $(\sqrt{2}x^2 + x - \sqrt{3})$.

Solution:

Multiplying the two expressions, we have,

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

Distribute the second term into the first term or vice versa, we have,

$$\begin{aligned} & (3\sqrt{2}x^2 - 1)(\sqrt{2}x^2 + x - \sqrt{3}) \\ & 3\sqrt{2}x^2(\sqrt{2}x^2 + x - \sqrt{3}) - 1(\sqrt{2}x^2 + x - \sqrt{3}) \end{aligned}$$

Simplifying further thru distributive property, we have,

$$\begin{aligned} & 3\sqrt{2}x^2(\sqrt{2}x^2 + x - \sqrt{3}) - 1(\sqrt{2}x^2 + x - \sqrt{3}) \\ & 6x^4 + 3\sqrt{2}x^3 - 3\sqrt{6}x^2 - 1(\sqrt{2}x^2 + x - \sqrt{3}) \end{aligned}$$

$$\begin{aligned} & 6x^4 + 3\sqrt{2}x^3 - 3\sqrt{6}x^2 - 1(\sqrt{2}x^2 + x - \sqrt{3}) \\ & 6x^4 + 3\sqrt{2}x^3 - 3\sqrt{6}x^2 - \sqrt{2}x^2 - x + \sqrt{3} \end{aligned}$$

$$\begin{aligned} & 6x^4 + 3\sqrt{2}x^3 - 3\sqrt{6}x^2 - \sqrt{2}x^2 - x + \sqrt{3} \\ & 6x^4 + 3\sqrt{2}x^3 - (3\sqrt{6} + \sqrt{2})x^2 - x + \sqrt{3} \end{aligned}$$

Therefore, the product of the two expressions is $6x^4 + 3\sqrt{2}x^3 - (3\sqrt{6} + \sqrt{2})x^2 - x + \sqrt{3}$.