

Question: Factor the expression completely.

$$x^{-3/2} + 2x^{-1/2} + x^{1/2}$$

Answer: First, we have to factor out the smallest exponent. In this problem the smallest exponent is $x^{-3/2}$. Recall: When factoring something out we subtract the exponent of the original value from the exponent we have factored out.

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

Now, simplifying the fractions we get:

$$x^{-3/2}(x^0 + 2x + x^2)$$

This is the same as:

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

Notice, that $(1 + 2x + x^2)$ factors, so we must factor further. Finally, we get:

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