

The GCF of the three terms is  $2x$ , so  $2x^3 + 6x^2 + 4x = 2x(x^2 + 7x + 12)$ .

Factor by grouping:

$$2x(x^2 + 7x + 12) = 2x(x^2 + 3x + 4x + 12) = 2x(x + 3)(x + 4)$$