When factoring, you need to look for two numbers, let's call them p and q, that add to b and multiply to (a)(c).

Steps:

1. After looking for a GCF, find two numbers, p and q, that multiply to ***ac*** (first number multiplied to the last number) and add to ***b*** (middle number)
2. Decompose the middle term into the two numbers px and qx
3. Common factor the 1st and 2nd half
4. Leftovers and Brackets

Factor each expression completely (In ax^2+bx+c, find two factors that multiply to ac and add to b). Look for a greatest common factor first!

1. $x^2+12x+32$

$$x^2 + 12x + 32$$

$$= x^2 + 4x + 8x + 32$$

x : 8

$$= x(x+4) + 8(x+4)$$

✓

$$= (x+8)(x+4)$$

$x \cdot 32$

$+ \; 12$

$1, 32$

$2, 16$

$4, 8$

$$\frac{4a^2}{4} - \frac{20a}{4} + \frac{16}{4}$$

$$= 4(a^2 - 5a + 4)$$

$$= 4(a^2 - 1a - 4a + 4)$$

$a \quad -4$

$$= 4[a(a-1) - 4(a-1)] \quad \checkmark$$

$$= 4(a-4)(a-1)$$

$\times$ $+4$

$+$ -5

$2 \quad 2$

$-1 \quad -4$

3) $x^2 + x - 42$

$= x^2 - 6x + 7x - 42$

$= x(x-6) + 7(x-6)$

$= (x+7)(x-6)$

×	−42
+	1

1, 42

2, 21

3, 14

−6, 7

5) $20x^2 - 7x - 6$

$= 20x^2 + 8x - 15x - 6$

$4x \qquad -3$

$= 4x(5x+2) - 3(5x+2)$ ✓

$= (4x-3)(5x+2)$

$\times \; -120$

$+ \; -7$

$8, -15$

$$\begin{array}{r} \otimes \quad -108 \\ \oplus \quad -12 \\ \hline 1, \\ 2, \\ 3, \end{array}$$