Chapter 7 - Quadratic Equation (examples) Cheat Sheet

by Cheat via cheatography.com/128959/cs/25409/

7a (pt1)

→ Factorise $3x - 12$

$$3x - 12 = 3 \times x - 3 \times 4 = 3(x - 4)$$

Expand your answer to check that it is correct.

7a (pt2)

→ Factorise $x^2 - 7x$

$$x^2 - 7x = x \times x - 7 \times x = x(x - 7)$$

7a (pt3)

→ Factorise $9ab + 12bc$

$$9ab + 12bc = 3b \times 3a + 3b \times 4c = 3b(3a + 4c)$$

7a (pt4)

→ Factorise $ab + 2bc + bd$

$$ab + 2bc + bd = b(a + 2c + d)$$

7a (pt5)

→ Factorise $8x^3 - 4x^2$

$$8x^3 - 4x^2 = 4x^2(2x - 1)$$

Sometimes we do not 'see' all the common factors to begin with. In this case, we may spot that 4 is a common factor and not 'see' the x^2, giving

$8x^3 - 4x^2 = 4(2x^3 - x^2)$

A check on the terms inside the bracket shows that there is another common factor, namely x^2,

so $8x^3 - 4x^2 = 4x^2(2x - 1)$

7b

→ Factorise $x^2 + 8x + 15$

$$x^2 + 8x + 15 = (x + 3)(x + 5)$$

The product of 3 and 5 is 15, and their sum is 8. The other possible pair is 1 and 15, but $1 + 15 = 16$ not 8.

Remember that 2×3 is the same as 3×2 so that $(x + 3)(x + 5)$ is the same as $(x + 5)(x + 3)$. The order in which the brackets are written does not matter.

7c

→ Factorise $x^2 - 7x + 12$

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

The product of -3 and -4 is $+12$. The outside product is $-4x$ and the inside product is $-3x$. Collecting these gives $-7x$. Other pairs looked at and discarded are -2 and -6, and -1 and -12.

7d

→ Factorise $x^2 + 13x + 36$

$$x^2 + 13x + 36 = (x + 4)(x + 9)$$

The possible pairs of numbers whose product is 36 are 1×36, 2×18, 3×12, 4×9 and 6×6. 4 and 9 is the only pair that gives a sum of 13.

7e (pt1)

→ Factorise $x^2 + 13x + 36$

$$x^2 + 13x + 36 = (x + 4)(x + 9)$$

The possible pairs of numbers whose product is 36 are 1×36, 2×18, 3×12, 4×9 and 6×6. 4 and 9 is the only pair that gives a sum of 13.

7e (pt2)

→ Factorise $6 + x^2 - 5x$

$$6 + x^2 - 5x = x^2 - 5x + 6 = (x - 2)(x - 3)$$

This needs to be rearranged into the familiar form, i.e. x^2 term first, then the x term and finally the number.

Possible pairs:
1, 6, sum 7; reject
2, 3, sum 5; correct

7e(pt3)

→ Factorise $x^2 + 6x + 9$

$$x^2 + 6x + 9 = (x + 3)(x + 3) = (x + 3)^2$$

If you cannot see the numbers required, write down all the pairs whose product is 9.

3×3
or 1×9

7f

→ Factorise $6 + x^2 - 5x$

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This needs to be rearranged into the familiar form, i.e. x^2 term first, then the x term and finally the number.

Possible pairs:
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7f

→ Factorise $6 + x^2 - 5x$

$$6 + x^2 - 5x = x^2 - 5x + 6 = (x - 2)(x - 3)$$

This needs to be rearranged into the familiar form, i.e. x^2 term first, then the x term and finally the number.

Possible pairs:
1, 6, sum 7; reject
2, 3, sum 5; correct

7g(pt 1)

→ Factorise $x^2 - 9$

$$x^2 - 9 = x^2 - 3^2 = (x + 3)(x - 3)$$

or $(x - 3)(x + 3)$

7g(pt 2)

→ Factorise $4 - x^2$

$$4 - x^2 = 2^2 - x^2 = (2 + x)(2 - x)$$

or $(2 - x)(2 + x)$

7h (pt1)

→ Factorise $12x - 6$

$$12x - 6 = 6(2x - 1)$$

7h (pt2)

→ Factorise $2x^2 - 8x - 10$

$$2x^2 - 8x - 10 = 2(x^2 - 4x - 5) = 2(x - 5)(x + 1)$$

Now check to see if the quadratic expression factorises.