

$$\textcircled{1} \quad 21x^5y^2 + 35x^4y^3 - 14x^3y^5$$

$$= 7x^3y^2(3x^2 + 5xy - 2y^3)$$

$$\textcircled{2} \quad x^3 + 4x^2 - 6x - 24$$

$$= x^2(x+4) - 6(x+4)$$

$$= (x+4)(x^2-6)$$

$$\textcircled{3} \quad x^2 - 11xy + 28y^2$$

$$= (x-7y)(x-4y)$$

Mult $c=28$	Add $b=-11$
$-1x-28$	
$-4x-7$	$-4+(-7)$

$$\textcircled{4} \quad 2x^2 + 12x - 54$$

$$= 2(x^2 + 6x - 27)$$

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

~~$$\textcircled{5} \quad 8y^2 - 10y - 3$$

$$= (2y-1)(4y+3)$$~~

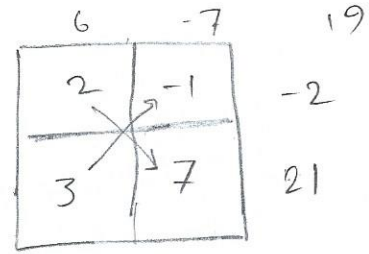
$a=8$	$c=-3$
1×8	-1×3
2×4	1×-3

$$= (2y-3)(4y+1)$$

A 8	C -3	B -10
2	1	2
4	-3	-12

$$(2y-3)(4y+1)$$

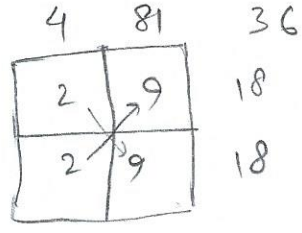
$$6x^2 + 19x - 7$$



$$4p^2 + 36p + 81$$

$$= (2p + 9)(2p + 9)$$

$$= (2p + 9)^2$$



13

$$25y^2 - 81$$

$$= (5y + 9)(5y - 9)$$

14

$$4x^4 - 49y^2$$

$$= (2x^2 + 7y)(2x^2 - 7y)$$

15

$$625x^3 + 135y^3$$

$$= 5(125x^3 + 27y^3)$$

$$= 5(5x + 3y)(25x^2 - 15xy + 9y^2)$$

Solving Quadratic Equation

① factoring

Ex. $25x^2 = 81$

$25x^2 - 81 = 0$

$(5x-9)(5x+9) = 0$

$5x-9=0$ or $5x+9=0$

$x = 9/5$

$x = -9/5$

$\{-9/5, 9/5\}$

② Square root property - for any complex number k
([↑] real & imaginary)

$x^2 = k$

$x = \pm \sqrt{k}$

Solve by square root property.

$\frac{25x^2}{25} = \frac{81}{25}$

$x^2 = \frac{81}{25}$

$x = \pm \sqrt{\frac{81}{25}}$

$x = \pm \frac{9}{5}$

Solve $v^2 = -9$ where v is a real number.

$v = \pm 3i$

$i = \sqrt{-1}$

No real solution

③ Completing the square $(5x-9)(5x+9)=0$

④ Quadratic formula, $5x-9=0$ or $5x+9=0$
 $x = 9/5$ $x = -9/5$

$$\left\{ -\frac{9}{5}, \frac{9}{5} \right\}$$

Solve by root prop.

$$(x+5)^2 = 36$$

$$\sqrt{(x+5)^2} = \pm \sqrt{36}$$

$$x+5 = \pm 6$$

$$x = -5 \pm 6$$

$$x = -5 + 6 \quad \text{or} \quad x = -5 - 6$$

$$x = 1 \quad \text{or} \quad x = -11$$

To solve $ax^2 + bx + c = 0$ where, $a \neq 0$
 by completing the square

① Make sure that $a=1$

$$\frac{ax^2}{a} + \frac{bx}{a} + \frac{c}{a} = \frac{0}{a}$$

$$x^2 + \frac{b}{a}x + \frac{c}{a} = 0$$

② Arrange so that variable terms are on one side and constant terms on other.

$$x^2 + \frac{b}{a}x + \frac{b^2}{4a^2} = \frac{-4 \cdot c \cdot a}{4a \cdot a} + \frac{b^2}{4a^2}$$

③ Factor $\sqrt{\left(x + \frac{b}{2a}\right)^2} = \pm \sqrt{\frac{-4ac + b^2}{4a^2}}$

④ $x + \frac{b}{2a} = \pm \frac{\sqrt{b^2 - 4ac}}{2a}$

⑤ $x = \frac{-b}{2a} \pm \frac{\sqrt{b^2 - 4ac}}{2a}$

⑥ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

solve this by completing the square.

$$x^2 - 6x + 13 = 0$$

$$x^2 - 6x + [9] = -13 + 9$$

$$\sqrt{(x-3)^2} = \pm \sqrt{-4}$$

$$x - 3 = \pm 2i$$

$$x = 3 \pm 2i$$

use quad formula to solve

$$6x^2 + 19x - 7 = 0$$

$$x = \frac{-19 \pm \sqrt{(19)^2 - 4(6)(-7)}}{2(6)}$$

$$= \frac{-19 \pm \sqrt{361 + 168}}{12}$$

$$= \frac{-19 \pm \sqrt{529}}{12}$$

$$x = \frac{-19 \pm 23}{12}$$

$$x = \frac{-19 + 23}{12} \quad \text{or} \quad x = \frac{-19 - 23}{12}$$

$$= \frac{4}{12} = \frac{1}{3}$$

$$= \frac{-42}{12} = -\frac{7}{2}$$

$ax^2 + bx + c$
Quadratic Formula

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

Discriminant

$$b^2 - 4ac$$

- if this is greater than zero and a perfect square you have two rational solutions
- if this is greater than zero and not a perfect square, there are two irrational solutions.
- if this equal zero, you have one rational solution.
- if this is negative, there are two imaginary solutions.