

$$a^2 - b^2 = (a+b)(a-b)$$

Factoring a Difference of Squares

a) $16x^2 - 9$

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

$$a=4x, b=3$$

b) $4x^2 - 25$

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

$$a=2x, b=5$$

c) $9x^2 - 1$

$$= (3x)^2 - 1^2 = (3x+1)(3x-1)$$

$$a=3x, b=1$$

d) $n^2 - 25$

$$= (n+5)(n-5)$$

Factoring a Perfect Square trinomial

$$a^2 + 2ab + b^2 = (a+b)^2$$

$$\frac{-40x}{2(4x)} = -5 = b$$

e) $16x^2 - 40x + 25$

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

$$a=4x, b=-5$$

f) $4x^2 - 4x + 1$

$$\frac{-4x}{4x} = -1 = b$$

$$\downarrow$$

$$(2x)^2 + 2(2x)(-1) + (-1)^2 = (2x-1)^2$$

$$a=2x, b=-1$$

g) $3x^2 + 6x + 3$

$$= 3(x^2 + 2x + 1)$$

$$= 3[(x)^2 + 2 \cdot x \cdot 1 + (1)^2] = 3(x+1)^2$$

$$a=x, b=1$$

In-Class Quiz 7

multiply:

①

$$(2x-1)(x^2+x+2)$$

2x	$2x^3$	$2x^2$	$4x$
-1	$-x^2$	$-x$	-2
	x^2	x	2

5 Pts

$$= 2x^3 + x^2 + 3x - 2$$

②

multiply: $(3x+2)^2$

5 Pts

$$= 9x^2 + 12x + 4$$

$$(a+b)^2 = a^2 + 2ab + b^2$$

$\begin{matrix} \nearrow & \uparrow & \nearrow \\ 3x & 2 & \end{matrix}$
 $\begin{matrix} \uparrow & \nearrow & \nearrow \\ (3x)^2 & 2(3x)(2) & + (2)^2 \end{matrix}$

③

multiply: $(\underbrace{5x}_a + \underbrace{1}_b)(5x-1)$

5 Pts

$$= (5x)^2 - (1)^2 = 25x^2 - 1$$

④

Factor:

$$\underbrace{x^3 - x^2}_{x^2(x-1)} - \underbrace{x + 1}_{-1(x+1)}$$

5 Pts

$$= x^2(x-1) - 1(x+1)$$

$$= (x-1)(x^2-1)$$

$$= (x-1)(x+1)(x-1)$$

$$= (x-1)^2(x+1)$$

$$x^2 - 1^2 = (x+1)(x-1)$$

⑤

Factor

$$\underbrace{x^3 + x^2}_{x^2(x+1)} + \underbrace{x + 1}_{1(x+1)}$$

$$= x^2(x+1) + 1(x+1) = (x+1)(x^2+1)$$

⑥ Factor $x^3 + 3x^2 + 3x + 9$

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

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

⑦ Factor $x^4 + 4x^2 + 4$

does not have x^2

$a^2 + 2ab + b^2 = (a+b)^2$

$a^2 \Rightarrow a = x^2$ as $x^4 = (x^2)^2$

$4 = b^2 \Rightarrow b = 2$

$2ab = 2(x^2)(2) = 4x^2$

$$\left(\frac{x^2}{a}\right)^2 + 2 \left(\frac{x^2}{a}\right) \left(\frac{2}{b}\right) + \left(\frac{2}{b}\right)^2 = (x^2 + 2)^2$$

⑧ Factor $x^4 - 1$

$a^2 - b^2 = (a+b)(a-b)$

$$= \left(\frac{x^2}{a}\right)^2 - \left(\frac{1}{b}\right)^2$$

$a = x^2$ $b = 1$

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

$$= (x^2 + i) \left(\frac{x^2}{a} - \frac{1}{b}\right)$$

$a = x$ $b = 1$

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