Section 5.7 - Special Product

Square a binomial: $(x+y)(x+y)$
$(x-y)(x-y)$

Ex) $(t+9)^2$, $(8a-5)^2$, $\left(c^3-\frac{7}{2}d\right)^2$

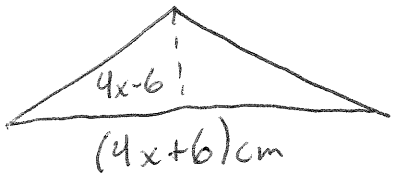
Sum and Difference: $(x-y)(x+y)$

Ex) $(m+2)(m-2)$ $(3y+4)(3y-4)$ $\left(b-\frac{2}{3}\right)\left(b+\frac{2}{3}\right)$

Higher Degrees: $(x+1)^3$, $(y+1)^4$ (Pascal's Triangle)

Simplify: $-8(y^2-2y+3)-4(2y^2+y-6)$
$(x-1)(x-2)+3x(x+3)$
$(3y-2)^2-(y-5)(y+5)$

Ex) Find a polynomial that represents the area of the triangle



$A=\frac{1}{2}bh$

Ex) $(t^2+u^2)^2$

Section 5.8 - Dividing Polynomials

Ex) $\frac{21x^5}{x^2}$, $\frac{10r^6s}{6rs^3}$

Rule: $\frac{a}{d}+\frac{b}{d}=\frac{a+b}{d}$

Ex) $\frac{9x^2+3x}{3x}$ $\qquad$ $\frac{12a^4b^3-18a^3b^2+2a^2}{6a^2b^2}$

Polynomial Division (Long Division)

Ex) ⊛ $(x^2+5x+6)\div(x+2)$

⊛ $(x^2+7x+12)\div(x+3)$

$(6x^2-7x-2)\div(2x-1)$

$(27x^3+1)\div(3x+1)$

$(8x^2+6x-3)\div(2x+3)$

⊛ $(4x^2+2x^3+12-2x)\div(x+3)$

$(6x^3+x^2-10x+4)\div(2x-1)$

⊛ $(x^4+x^3+x^2+x+1)\div(x+1)$

Synthetic Division

Ex) Try the above examples above with ⊛

* Remember to switch sign for number in box.

Section 6.1 - Factoring by Grouping

Ex) $8m+24$ $\quad 6f+36$

$35a^3b^2-14a^2b^3$ $\quad 24s^2t^2-42s^3t$

$3x^4-5x^3+x^2$ $\quad y^6-10y^4-y^3$

Ex) Factor -1 from each

$-a^3+2a^2-4$, $6-x$, $-b^4-3b^2+2$

Ex) Factor $-20m+30$, $-44c+55$

Ex) Factor $x(x+4)+3(x+4)$

$2y(y-1)+7(y-1)$

Ex) Factor by grouping $2x^3+x^2+12x+6$

$5c-5d+cd-d^2$

$4t+4s+4tz+4sz$ $\quad 3n^3+2n^2+9n+6$

$10k+10m-2km-2m^2$ $\quad 7x+7y+xy-y^2$

$x^2-ax-x+a$

6.2 - Factoring x^2+6x+C

"c"

Factors	Sum

Ex) $x^2+8x+15$

$y^2+7y+10$

$y^2-13y+12$

$g^2-2g-24$

p^2-6p+8

x^2+x-20

$z^2-4z-21$

$-h^2+2h+63$

Ex) $x^2-4xy-5y^2$

$s^2+6st-7t^2$

Ex) $2x^4+26x^3+80x^2$

$4m^5+8m^4-32m^3$

$-13g^2+36g+g^3$

t^3+4t^2-12t

Ex) (Non Factorable)

x^2+2x+3

x^2-4x+6

Ex) x^2+x-20

$x^2+5x-4x-20$

$x^2-4xy-5y^2$

$x^2-5xy+xy-5y^2$

Ex) $2x^3-20x^2-18x$

$2x(x^2-10x+9)$

$(-9x-1x)$

Ex) $3m^3-27m^2+24m$

Section 6.3 - Factoring ax^2+bx+c

Ex) $2x^2+5x+3$

$2x^2+5x+2$

$6a^2-17a+5$

$6b^2-19b+3$

Ex) $3y^2-7y-6$

$5t^2-23t-10$

Ex) $4b^2+8bc-45c^2$

$4x^2+4xy-3y^2$

Ex) $-8x^3+2x^2+3x$

$-14y^3+22y^2+12y$

Ex) $10x^2+13x-3$

$15a^5-17x^4+6x^3$

Ex) $21a^4-13a^3+2a^2$

Section 6.4 - Factoring Perfect Square / Diff of 2 squares

Recall: $A^2+2AB+B^2=(A+B)^2$

$A^2-2AB+B^2=(A-B)^2$

Ex) $x^2+20x+100$

$9x^2-30xy+25y^2$

Ex) $4a^3-4a^2+a$

$49x^3-14x^2+x$

Recall: $(A+B)(A-B)=A^2-B^2$

Ex) x^2-9 n^2-45 (*)

$16-b^2$ a^2-81

Ex) c^2-4 s^2+36 (*)

x^2-24 (*) $121-t^2$

Ex) $25x^2-49$ $16y^2-9$

$-121z^2+4y^4$ $9m^2-64n^4$

Ex) $8x^2-8$

x^4-16

Section 6.5 - Sum/Difference of Cubes

Rules: $F^3+L^3 = (F+L)(F^2-FL+L^2)$

$F^3-L^3 = (F-L)(F^2+FL+L^2)$

Ex) x^3-8

h^3+27

Ex) a^3-64b^3

$8c^3-1$

Ex) $-2t^5+250t^2$

$4c^3+4d^3$

Section 6.6 - Factoring Strategy

Steps (1) Factor out common terms from each piece

(2) a) 2 terms
* Try special formulas * groupings

b) 3 terms
* Try special formulas
* Try grouping

c) 4+ terms
* Try groupings

(3) Factor remaining terms

(4) Check factorization

Ex) $2x^4-162$

$11a^6-11a^2$

$-4c^5d^2-12c^4d^3-9c^3d^4$

$-32h^4-80h^3-50h^2$

Ex) y^4-3y^3+y-3

5^4+6^3+86+8

$4n^3-4n^2+32n$

$6m^2-54m+6m^3$

Ex) $3y^3-4y^2-4y$

$6y^3+21y^2-12y$