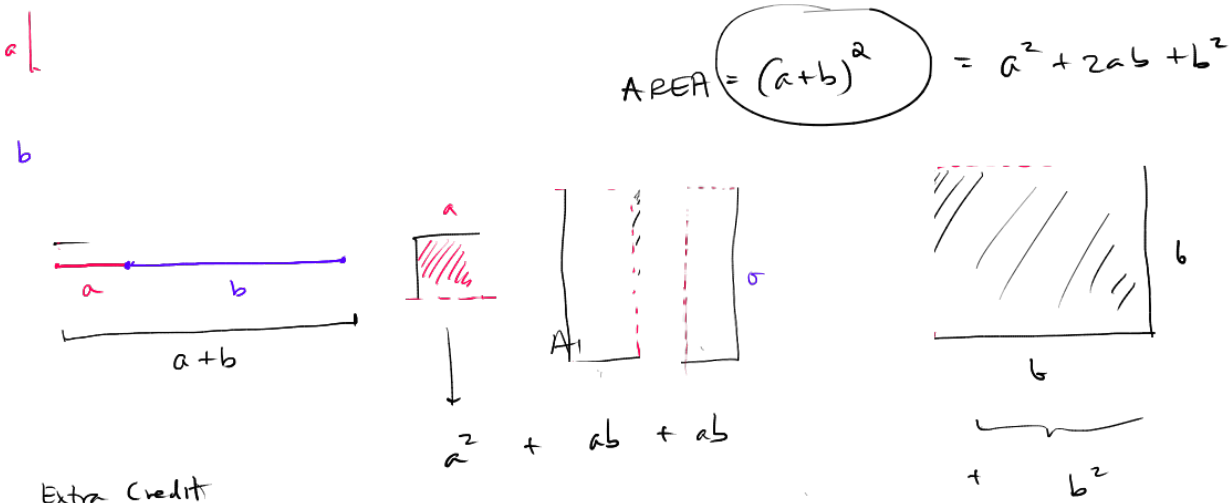
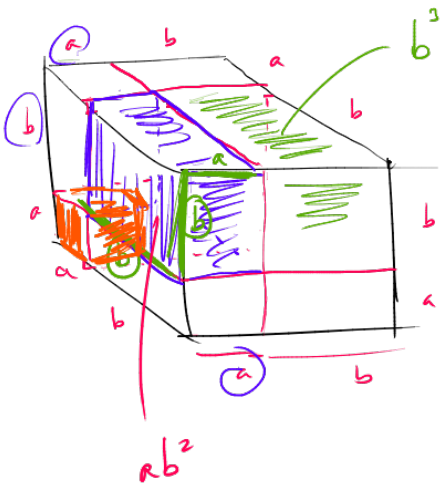
Monday — Week 3 — Factoring / Algebra (combine fraction)



Extra Credit

start:



decompose

$a^3 + 3ab^2 + 3ba^2 + b^3$

★ preferred

$a^3 + 3a^2b + 3ab^2 + b^3 = (a+b)^3$

Factor Trinomials $Ax^2 + Bx + C$

$x^2 + 7x + 12$

A ↑ C ↑

① Bust up middle term into sum of factor of 1 & 12

1, 2, 3, 4, 6, 12

$7x = 3x + 4x$

② $x^2 + 3x + 4x + 12$

③ factor by groupings

$x(x+3) + 4(x+3) = (x+3)(x+4)$

Ex. $6n^2 - 39n - 21$ use subtraction

$-39n = -27n - 12n$

$6n^2 - 27n - 12n - 21$

switch

$3n(2n-9) - 3(4n+7)$ stuck.

$6n^2 - 12n - 27n - 21$

$6n(n-2) - 3(9n+7)$ stuck.

21
6
126

2, 63
2, 7, 9
2, 3, 7, 9

$-42 + 3$

6, 7, 9

$(6n+3)(n-7)$

$6n^2 - 42n + 3n - 21$

$6(n^2 - 7n) + 3(n-7)$

$6n(n-7) + 3(n-7)$

$(6n+3)(n-7)$

Ex. $x^2 + 14x - 32$

$= 16x - 2x$

AC: -32

Factors of -32.

$\pm 1, \pm 2, \pm 4, \pm 8, \pm 16$

$x^2 + 16x - 2x - 32$

$x^2 - 2x + 16x - 32$

$x(x-2) + 16(x-2) = (x-2)(x+16)$

6.4 Simplifying Fractions

Terms

$$\frac{A+B}{CD}$$

CD, B, A are all terms

Factors

$$\frac{A(B+C)}{D \cdot F}$$

A, (B+C), D, F

all factors

↕

multiplication

Ex. Simplify by cancelling factors — not terms.

$$\frac{2a}{2ax} = \frac{2a(1)}{2a(x)} = \frac{1}{x}$$

Ex. $\frac{2a}{2a+x} \neq \frac{1}{1+x}$ ← leave alone

$$\frac{2a}{2a+x\left(\frac{2a}{2a}\right)} = \frac{2a}{2a\left(1+\frac{x}{2a}\right)} = \frac{1}{1+\frac{x}{2a}}$$

Ex. $$\frac{x^2-4x+4}{x^2-4} = \frac{(x-2)(x-2)}{(x-2)(x+2)} = \frac{x-2}{x+2}$$

Simplify

Ex. $$\frac{x^2-1}{1-x} = \frac{(x-1)(x+1)}{1-x} = \frac{(x-1)(x+1)}{-(x-1)} = \frac{x+1}{-1} = -(x+1)$$

$$-x-1$$

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

6.6 divide by fraction ⟹ flip bottom fraction & multiply top by it

Ex. $\dfrac{\left(\frac{1}{x+1}\right)}{\left(\frac{x}{x-1}\right)} = \left(\frac{1}{x+1}\right)\cdot\left(\frac{x-1}{x}\right) = \boxed{\dfrac{(x-1)}{x(x+1)}}$

6.7 Add fractions!

1. common denominator! product of two often works.

$$\left(\frac{x-1}{x-1}\right)\frac{1}{x+1} + \frac{x}{x-1}\left(\frac{x+1}{x+1}\right)$$

$$\frac{x-1}{(x-1)(x+1)} + \frac{\overbrace{x^2+x}^{x(x+1)}}{(x-1)(x+1)} = \boxed{\frac{x^2+2x-1}{(x-1)(x+1)}}$$

denoms are same