Note Title 2/8/2016

(1) $12x^3y^2 - 243xy^2$

$3xy^2(4x^2 - 81)$

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

(2) $9 - x^2$

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

(3) $9 + x^2$

prime

(4) $x^3 + 6x^2 - 4x - 24$

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

$(x+6)(x^2-4)$ ← DOTS

$(x+6)(x+2)(x-2)$

(5) $12a^3 - 24a^2 + 4a$

$4a(3a^2 - 6a + 1)$

$4a(3a - \quad)(a - \quad)$

(6) $a^2 + a - 3$

prime

$x^2 + x - 3 = 0$

for $ax^2 + bx + c = 0$

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

$a = 1$

$b = 1$

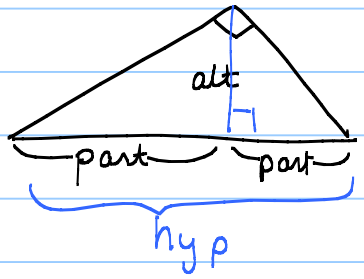
$c = -3$

$\dfrac{-1 \pm \sqrt{1+12}}{2} = \dfrac{-1 \pm \sqrt{13}}{2}$

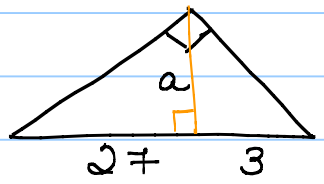
$(-1+\sqrt{13})/2$ & $(-1-\sqrt{13})/2$

Rt △

Alt-on-Hyp Thms



$alt^2 = (\text{part hyp})(\text{part hyp})$

* 

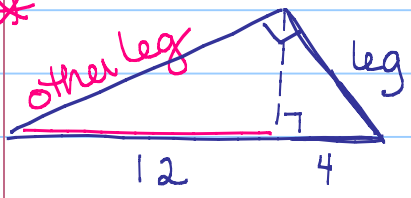
$a^2 = 3(27)$

$60 + 21$

$a^2 = 81$

$a = 9$

No neg lengths.

** 

$leg^2 = (\text{close part})(\text{whole hyp})$

$leg^2 = 4(16)$

$leg = 8$

$(\text{other leg})^2 = 12(16)$

$4 \quad 3 \quad 4 \quad 4$

$2 \quad 2$

$2\sqrt{3} \cdot 4$

$\text{other leg} = 8\sqrt{3}$

SOAP

Same | opp site | always positive

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

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

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

$27a^3b^3 + 8$

$x = 3ab$ & $y = 2$

$(3ab+2)(9a^2b^2 - 6ab + 4)$

33.

38. $x^2 + x + xy + y$

$x(x+1) + y(x+1) \Rightarrow (x+y)(x+1)$

85 $6x^3 - 28x^2 + 16x$

GCM: $2x$

$2x(3x^2 - 14x + 8)$

$24x^2 = (-12x)(-2x)$

$2x(3x^2 - 12x - 2x + 8)$

$2x[3x(x-4) - 2(x-4)]$

$2x(3x-2)(x-4)$

Equation $(=) \Rightarrow$ solve

Expression (no $=$ or $>, <$) then simplify or factor

86) $6y^3 - 8y^2 - 30y$

$2y(3y^2 - 4y - 15)$

$-45y^2 = (-9y)(5y)$

then

$2y[3y^2 - 9y + 5y - 15]$

$2y[3y(y-3) + 5(y-3)]$

$2y(y-3)(3y+5)$

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77. $1 - 8ab - 20a^2b^2$

$-20a^2b^2 = (-10ab)(2ab)$

$1 + 2ab - 10ab - 20a^2b^2$

$(1 + 2ab) - 10ab(1 + 2ab)$

$(1 - 10ab)(1 + 2ab)$

$9 - x^2 \rightarrow (3-x)(3+x)$

$9 + x^2 \rightarrow$ can't factor

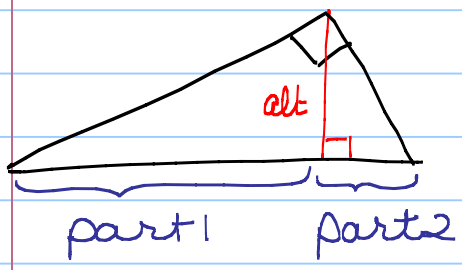
$-20a^2b^2$

$-1($

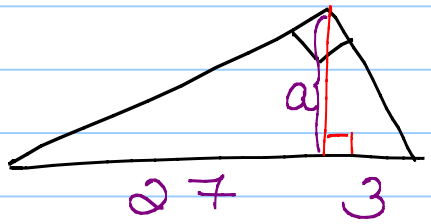
External → Empirical → Analytic
↳ follow ↳ Observe ↳ Generalize

9.3: Alt - or Hyp Thm

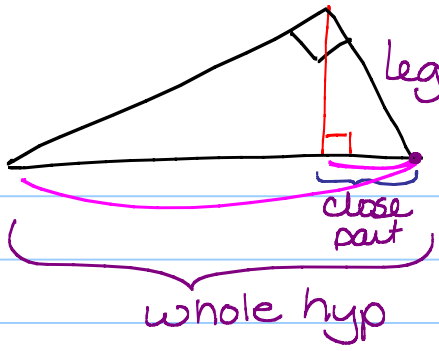
longest side of rt △

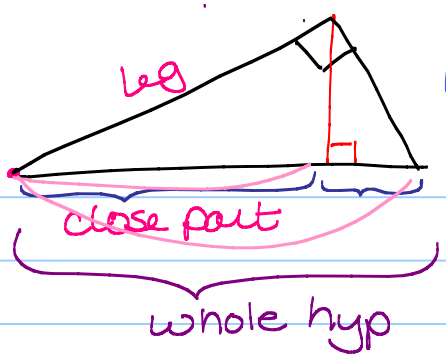


$alt^2 = (part1)(part2)$

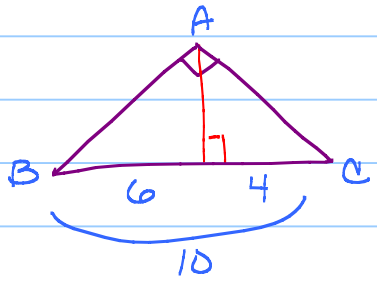


$a^2 = 3(27)$
$a^2 = 81$
$a = 9$





$leg^2 = (close\ part)(whole\ hyp.)$



$AB^2 = 6(10)$

$AB = \sqrt{2 \cdot 3 \cdot 2 \cdot 5}$

$AB = 2\sqrt{15}$

$AC^2 = 4(10)$

$AC = 2\sqrt{10}$

P8: FACTORING Q&A

Homework

32, 33, 39

40 42 45 48 50

72, 80

32. $x^2 - 2x + 4$

$4x^2 = (\quad)(\quad)$ NOT FACTORABLE

PRIME

For $ax^2 + bx + c = 0$ $\quad x = \dfrac{-b \pm \sqrt{b^2-4ac}}{2a}$

$a=1,\ b=-2,\ c=4 \longrightarrow \quad x = \dfrac{-(-2) \pm \sqrt{4-4(1)(4)}}{2(1)}$

$x = \dfrac{2 \pm \sqrt{4-16}}{2}$

$\dfrac{2 \pm \sqrt{-12}}{2}$

$\dfrac{2 \pm 2\sqrt{3}\sqrt{-1}}{2}$

$\dfrac{2 \pm 2\sqrt{3}\ i}{2}$

33. prime

29. $4a^2 - b^2$ Difference of Two Squares (DOTS)

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

What if $4a^2 + b^2$ prime or not factorable

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

$4a^2 + 2ab + 2ab + b^2 = 4a^2 + 4ab + b^2$

39. $ax + 2x + a + 2$

$x(a+2) + 1(a+2)$

$\boxed{(x+1)(a+2)}$

40. $18x^3 - 63x^2 + 9x$

$\boxed{9x(2x^2 - 7x + 1)}$

$2x^2 = (\quad)(\quad)$

45. $25p^2 - 70pq + 49q^2$

signs of factors signs of factors same

$(5p - 7q)(5p - 7q) \rightarrow \boxed{(5p - 7q)^2}$

FOIL TO CHECK:

$25p - 35pq - 35pq + 49q^2$

SOAP

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

S : same

O : opposite

AP always positive

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

Diff of two squares

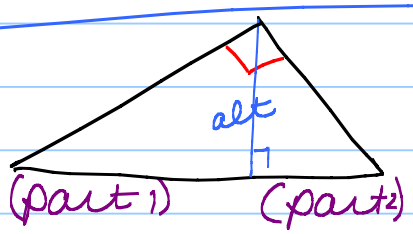
$4-x^2 \Rightarrow (2-x)(2+x)$

$4+x^2 \Rightarrow$ not factorable

9.3 Alt-on-Hyp Thms

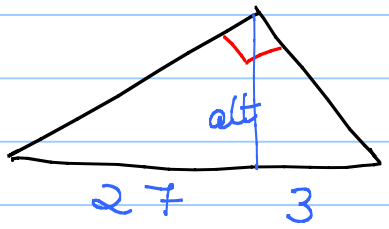
↑ ⊥ ↓ Long side

rt △



$alt^2 = (part\ 1)(part\ 2)$

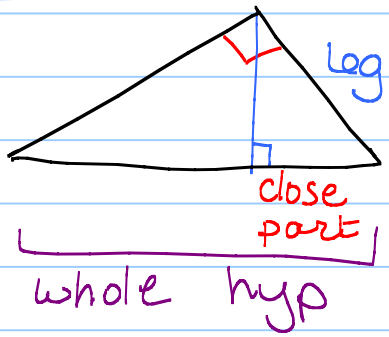
Ex 1



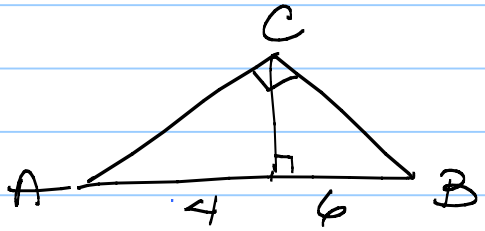
$alt^2 = 3 \cdot 27$

$alt = \sqrt{3 \cdot 3 \cdot 3 \cdot 3}$

$alt = 9$

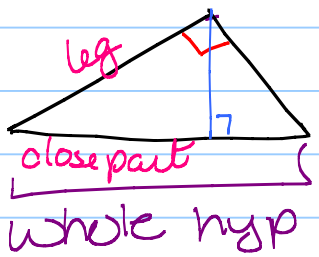


$leg^2 = (close\ part)(whole\ hyp)$



Find AC =

BC =



$AC^2 = 4(10)$

$AC = 2\sqrt{10}$

$BC = 6(10)$

$BC = 2\sqrt{15}$