

Factorising using a common multiple

$$5x^2+10x \quad \text{LCM is } 5x$$

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

Factorising & Expanding Two Squares

Rewrite as a difference of two squares x^2-16

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

Rewrite as a difference of two squares

$$16x^2-9y^2 = (4x)^2-(3y)^2$$

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

Difference of squares in the form $ab^2x^2-ac^2y^2$

$$18x^2y^4-98x^2z^2 = 2x^2(9y^4-49z^2)$$

$$= 2x^2[(3y^2)^2-(7z)^2] = 2x^2(3y+7z)(3y-7z)$$

Factorising Monic Trinomials

Factorise x^2+4x+3 Find factors of 3, summing to 4

$$1 \text{ \& } 3 = (x+1)(x+3)$$

Factorise $x^2-12x+32$ Find factors of 32, summing to -12

$$-4 \text{ \& } -8 = (x-4)(x-8)$$

Perfect Squares

Is $16x^2-8^2+1$ a perfect square? $a=4, b=1$

$$-2 \times 4 \times 1 = -8 \quad \text{Yes, } (4x-1)^2$$

Algebraic Fractions

$$\frac{5x+10}{5} = \frac{5(x+2)}{5} = (x+2)$$

Factorise where possible

$$x^2-5x+6/x^2-7x+12 = (x-3)(x-2)/(x-3)(x-4)$$

$$= (x-2)(x-4)$$

Multiply & Dividing

$$\frac{2x^2/x^2+x}{4x^2/6x+6} = \frac{2x^2/x(x+1) \div 4x^2/6(x+1)}{6(x+1)/4x^2} = \frac{2x^2/x(x+1) \times 6(x+1)}{6(x+1)/4x^2}$$

$$= 6/2x = 3/x$$

Adding & Subtracting

$$\frac{5}{xy} + \frac{6}{xy} - \frac{m}{xy} = \frac{5+6-m}{xy}$$

$$= \frac{11-m}{xy}$$

b. when the denominators are different $1/x - 2/y$

LCD = xy

$$1 \times \frac{y}{xy} - 2 \times \frac{x}{xy} = \frac{y-2x}{xy}$$

$$1/x - 2/y = y/xy - 2x/xy = y-2x/xy$$

Trigonometry

$$c^2 = a^2 + b^2 \quad \text{SOH CAH TOA}$$

DMS button on calculator $XX^\circ XX' XX''$

Find the missing side. x

$$\tan 77^\circ = x/5.9 \quad x = 5.9 \tan 77^\circ$$

$$= 26$$

b. x in denominator

$$\tan 29^\circ \cdot 16' = 23.1/x \quad x = 23.1 / \tan 29^\circ 16'$$

$$= 41.22$$

Find a missing angle

use \sin^{-1} \tan^{-1} or \cos^{-1} with existing sides

Simultaneous Equations

Substitution Method

$$y = 3x-7 \quad (1) \quad 2x-3y=12 \quad (2)$$

Sub (1) into (2) $2x+3(3x+7) = 12$

$$2x+9x-21=12 \quad 11x = 33$$

$$x = 3$$

Elimination Method

$$3x-2y = 14 \quad (1)$$

$$5x+2y = 18 \quad (2) \quad +$$

$$8x = 32 \quad x = 4$$

sub into (2)

$$20+2y=18 \quad 2y = -2$$

$$-20 \text{ both sides} \quad y = -1$$

