

Factorising using a common multiple

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

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

Factorising & Expanding Two Squares

$$\text{Rewrite as a difference of two squares} \quad x^2-16$$

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

$$\text{Rewrite as a difference of two squares}$$

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

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

$$\text{Difference of squares in the form } ab^2x^2-ac^2y^2$$

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

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

Factorising Monic Trinomials

$$\text{Factorise } x^2+4x+3 \quad \text{Find factors of 3, summing to 4}$$

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

$$\text{Factorise } x^2-12x+32 \quad \text{Find factors of 32, summing to -12}$$

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

Perfect Squares

$$\text{Is } 16x^2-8^2+1 \text{ a perfect square?} \quad a=4, b=1$$

$$-2x4x+1=8 \quad \text{Yes, } (4x-1)^2$$

Algebraic Fractions

$$5x+10/5 = 5(x+2)/5$$

$$= (x+2)$$

$$\text{Factorise where possible}$$

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

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

$$\text{Multiply \& Dividing} \quad 2x^2/x^2+x \div 4x^2/6x+6$$

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

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

$$\text{Adding \& Subtracting}$$

$$5/xy + 6/xy - m/xy = 5+6-m/xy$$

$$= 11-m/xy$$

$$\text{b. when the denominators are different} \quad 1/x - 2/y$$

$$\text{LCD} = xy \quad 1 \times y/xy - 2 \times x/xy$$

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

Trigonometry

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

$$\text{DMS button on calculator} \quad \text{XX°XX'XX''}$$

$$\text{Find the missing side. } x$$

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

$$= 26$$

$$\text{b. } x \text{ in denominator}$$

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

$$= 41.22$$

$$\text{Find a missing angle}$$

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

Simultaneous Equations

$$\text{Substitution Method}$$

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

$$\text{Sub (1) into (2)} \quad 2x+3(3x+7) = 12$$

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

$$x = 3$$

$$\text{Elimination Method}$$

$$3x-2y=14 \text{ (1)}$$

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

$$\text{-----}$$

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

$$\text{sub into (2)}$$

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

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