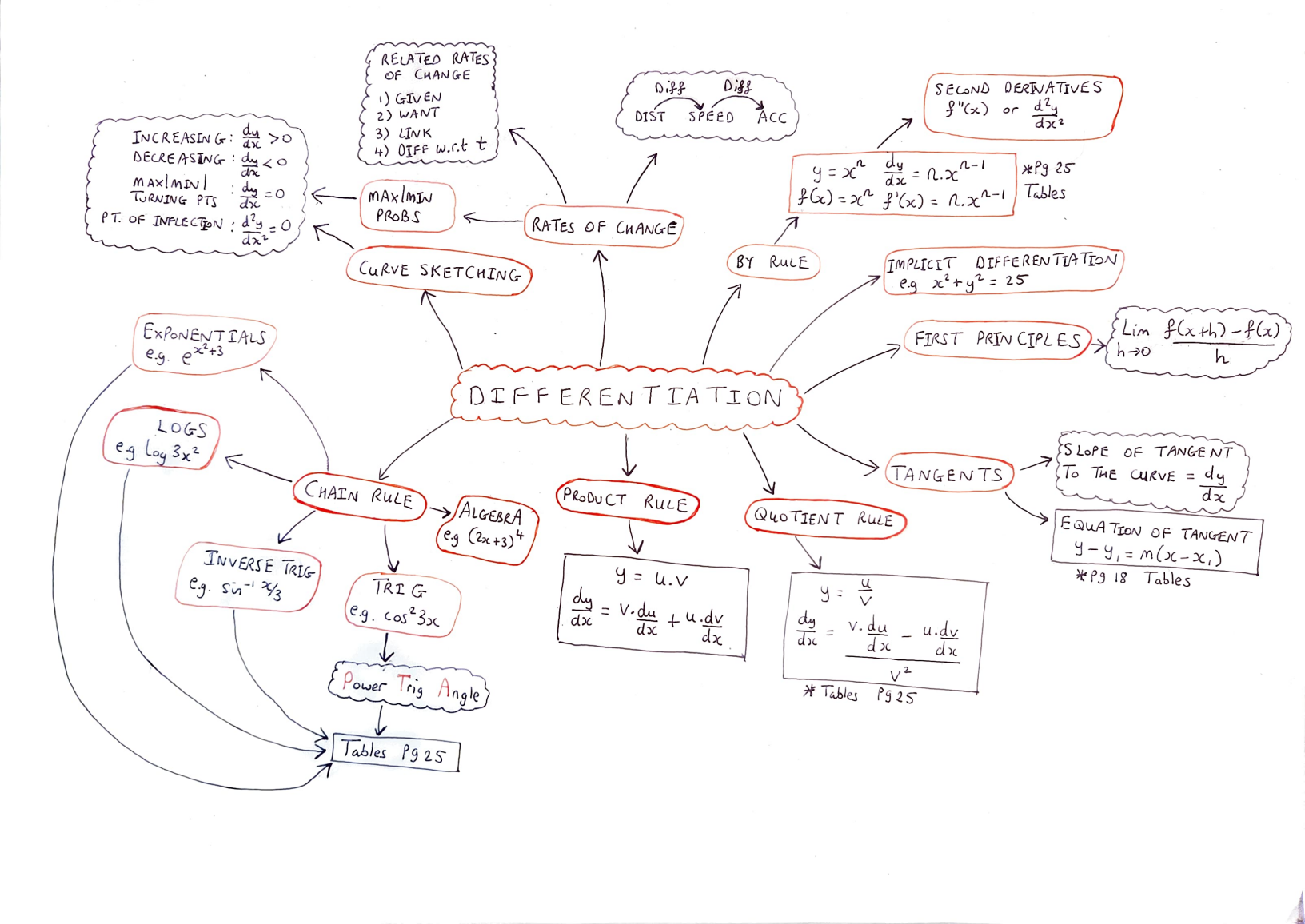
DIFFERENTIATION
RELATED RATES OF CHANGE
1) GIVEN
2) WANT
3) LINK
4) DIFF w.r.t t
Diff Diff
DIST SPEED ACC
SECOND DERIVATIVES
$f''(x)$ or $\frac{d^2y}{dx^2}$
INCREASING: $\frac{dy}{dx} > 0$
DECREASING: $\frac{dy}{dx} < 0$
MAX/MIN/TURNING PTS: $\frac{dy}{dx} = 0$
PT. OF INFLECTION: $\frac{d^2y}{dx^2} = 0$
MAX/MIN PROBS
RATES OF CHANGE
$y = x^n$ $\frac{dy}{dx} = n.x^{n-1}$
$f(x) = x^n$ $f'(x) = n.x^{n-1}$
*Pg 25 Tables
CURVE SKETCHING
BY RULE
IMPLICIT DIFFERENTIATION
e.g $x^2 + y^2 = 25$
FIRST PRINCIPLES
$\lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$
EXPONENTIALS
e.g. $e^{x^2+3}$
LOGS
e.g $\log 3x^2$
CHAIN RULE
ALGEBRA
e.g $(2x+3)^4$
INVERSE TRIG
e.g. $\sin^{-1} x/3$
TRIG
e.g. $\cos^2 3x$
Power Trig Angle
Tables Pg 25
PRODUCT RULE
$y = u.v$
$\frac{dy}{dx} = v.\frac{du}{dx} + u.\frac{dv}{dx}$
QUOTIENT RULE
$y = \frac{u}{v}$
$\frac{dy}{dx} = \frac{v.\frac{du}{dx} - u.\frac{dv}{dx}}{v^2}$
* Tables Pg 25
TANGENTS
SLOPE OF TANGENT TO THE CURVE = $\frac{dy}{dx}$
EQUATION OF TANGENT
$y - y_1 = m(x - x_1)$
*Pg 18 Tables