

## Are you ready? Here is a $5 \times 5$ checklist

### 1 Geometry:

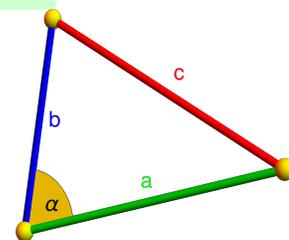
Triangles: right, isosceles, equilateral, obtuse, acute

Pythagorean theorem  $a^2 + b^2 = c^2$

Cos-formula  $c^2 = a^2 + b^2 - 2ab \cos(\alpha)$

Sin-formula  $a/\sin(\alpha) = b/\sin(\beta) = c/\sin(\gamma)$

Lines, parabola, circles, ellipses, hyperbola



### Functions:

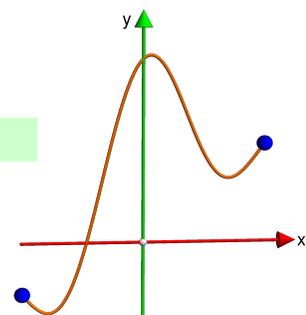
Functions, notation like  $x^n, \sqrt{x+1}, x^{-3/4}, (1+x)^n, 2^x$

Square roots and higher order roots  $\sqrt[n]{x}$

Log and Exp  $\log(x) = \ln(x)$  and  $e^x$  and  $a^x = e^{x \log(a)}$

Trig functions  $\sin, \cos, \tan, \cot, \sec, \csc$

Inverse trig functions:  $\arctan, \arcsin, \arccos$



### Algebra:

Solving linear and quadratic equations

Add, multiply, divide and factor polynomials

Exp laws  $a^b a^c = a^{b+c}, (a^b)^c = a^{bc}, a^b = e^{b \log(a)}$

Trig laws  $\sin^2(x) + \cos^2(x) = 1, \cos^2(x) = (1 + \cos(2x))/2$

Log identities  $\log(xy) = \log(x) + \log(y), \log(a^b) = b \log(a)$

### Derivatives:

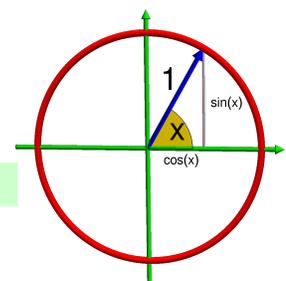
Mechanisms for discontinuity, Hôpital

Product, quotient and chain rule

Find extrema using first derivative test

Find critical point using second derivative test

Taylor formula  $f(x) = f(0) + f'(0)x + f''(0)x^2/2 + \dots$



### Integrals:

Integration by parts like  $\int x^5 \cos(x) dx$

Integration by substitution like  $\int \log(x)/x dx$

Partial fractions like  $2/(1-x^2) = 1/(1+x) + 1/(1-x)$

Convergence of  $\int_0^1 x^s dx$  or  $\int_1^\infty x^s dx$

FTC  $\int_0^x f'(t) dt = f(x) - f(0)$        $(\int_0^x f(t) dt)' = f(x)$

<sup>1</sup>There is a diagnostic quiz on the Canvas page with 25 questions