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| Trigonometry & Differentiation |
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| What you are given and what you need to know in C3 |

**Formulae for edexcel**

2013/14

Trigonometry & Differentiation

What you are given and what you need to know in C3

# Exact Values of trigonometric functions

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **x˚ (deg)** | **x˚ (rad)** | **sin** | **cos** | **tan** |
| 0 | 0 | 0 | 1 | 0 |
| 30 |  |  |  |  |
| 45 |  |  |  | 1 |
| 60 |  |  |  | √3 |
| 90 |  | 1 | 0 | - |
| 180 | π | 0 | -1 | 0 |

# Rules and facts

1. Sin2x + cos2x = 1
2. Tan x =
3. Cosec x =
4. Sec x =
5. Cot x = =

# Applying these rules

Dividing (1) by sin2x will give you: 1 + cot2x = cosec2x

Dividing (1) by cos2x will give you: tan2x + 1 = sec2x

# Addition Formulae\*

1. sin(A+B) = sinAcosB + cosAsinB
2. sin(A-B) = sinAcosB – cosAsinB
3. cos(A+B) = cosAcosB – sinAsinB
4. cos(A-B) = cosAcosB + sinAsinB
5. tan(A+B) =
6. tan(A-B) =

# Finding the Double Angle Formulae, by applying these rules

Substituting in A for B in (1) will give you: sin2A = 2sinAcosA

Substituting in A for B in (3) will give you: cos2A = cos²A – sin²A

If you then substitute in **sin2x = 1 - cos2x**, you get: cos2A = 2cos²A – 1

Alternatively, if you substitute in **cos2x = 1 - sin2x**, you get: cos2A = 1 - 2sin²A

Substituting in A for B in (5) will give you: tan2A =

**R addition Formulae**

If you are given the form acosθ + bsinθ : use Rcos(θ - α )

If you are given the form asinθ + bcosθ : use Rsin(θ + α )

Where a,b & R are positive and α is acute

**Factor Formulae\***

Sin A + sin B = 2sin ( ) cos ( )

Sin A - sin B = 2cos ( ) sin ( )

cos A + cos B = 2cos ( ) cos ( )

cos A - cos B = -2sin ( ) sin ( )

Differentiation

**Chain rule**

If y = f(u) and u = g(x), then:

**Product rule**

If y = u(x)v(x), where u and v are functions of x then:

**Quotient rule\***

If , where u and v are functions of x then:

**Exponential Functions**

If y = ef(x), then

**Functions of Ln(x)**

If y = ln [f(x)], then

**Function in terms of y**

If x=f(y), then

**Trigonometric differentiation**

|  |  |  |
| --- | --- | --- |
| **y=f(x)** |  | **In formula book** |
| Sin x | Cos x |  |
| Cos x | -Sin x |  |
| Tan (kx) | k sec2(kx) | \* |
| Cosec x | -cosec x cot x | \* |
| Sec x | Sec x tan x | \* |
| Cot x | -cosec2x | \* |