



**BHASVIC**

MaTHS

**C3**

**C3 June/July 2017**

**Maths Survival Kit**

**Name.....**

## Plan for June/July lessons

<b>Date</b>	<b>Videos</b>	<b>Page</b>	<b>Assignment due in</b>
Tuesday June 13 <sup>th</sup>			
Friday June 16 <sup>th</sup>	Algebraic Fractions Algebraic Division	<b>3</b> <b>4</b>	
Tuesday June 20 <sup>th</sup>	Reciprocal Trig Functions	<b>5</b>	
Thursday June 22 <sup>nd</sup>	Pythagorean Identities Algebraic Proof	<b>6</b>	
Friday June 23 <sup>rd</sup>	Chain Rule	<b>7</b>	<b>1</b>
Tuesday June 27 <sup>th</sup>	The Product Rule The Quotient Rule	<b>8</b> <b>9</b>	
Thursday June 29 <sup>th</sup>	Differentiating trig functions	<b>10</b>	
Friday June 30 <sup>th</sup>	$e^x, \ln x, a^x$	<b>11</b>	<b>2</b>
Tuesday July 4 <sup>th</sup>	Compound Angle Formulae	<b>12</b>	
Thursday July 6 <sup>th</sup>	Double/Half Angle formulae	<b>13</b>	<b>3</b>
Thursday July 13 <sup>th</sup>	Factor formulae	<b>14</b>	
Friday July 14 <sup>th</sup>	Integration as the reverse of differentiation	<b>15</b>	<b>4</b>
Wednesday July 18 <sup>th</sup>	Trig Consolidation (solving equations)	<b>16</b>	

In order to prepare for lessons, please watch the videos outlined on [www.mickmacve.com/junejuly-2017.html](http://www.mickmacve.com/junejuly-2017.html)

Please note that there will be no lessons on the following dates. (You will be concessioned)

Thursday June 15<sup>th</sup>      Progression Day

Friday July 7<sup>th</sup>          Careers Day

Tuesday July 11<sup>th</sup>      Maths Teachers Conference

### C3 : Algebraic Fractions

<https://youtu.be/MC90CB-s8QM>

- Be able to add, subtract, multiply and divide simple algebraic fractions
- Have practiced factorising and 'cancelling'
- Recognise the difference of squares
- Be able to use adding, subtracting, multiplying and dividing simple algebraic fractions to solve algebraic equations



*Simplify*  $\frac{2}{y^2-x^2} + \frac{3}{y-x}$

### C3 Algebraic Division

<https://youtu.be/tfjYlrkvall>

- Be able to use algebraic division to find quotients and remainders



Express  $\frac{4x^3 - 5x^2 + 3x - 14}{x^2 + 2x + 1}$  in mixed number format

### C3: Reciprocal Trig Functions

<https://youtu.be/5mpYSXxktHU>

- Know the definitions of  $\sec x$ ,  $\operatorname{cosec} x$  and  $\cot x$  in terms of  $\cos x$ ,  $\sin x$  and  $\tan x$
- Be able to sketch the graphs of  $\sec x$ ,  $\operatorname{cosec} x$  and  $\cot x$  without using a calculator
- Be able find values of  $\sec x$ ,  $\operatorname{cosec} x$  and  $\cot x$  for real  $x$  over a given interval.
- Understand that  $\sec x = \frac{1}{\cos x}$  not  $\frac{1}{\cos}(x)$  and that the latter makes no sense
- Use reciprocal trig functions to solve equations and prove identities

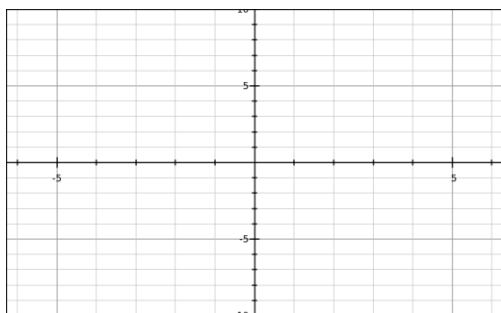


Complete this table:

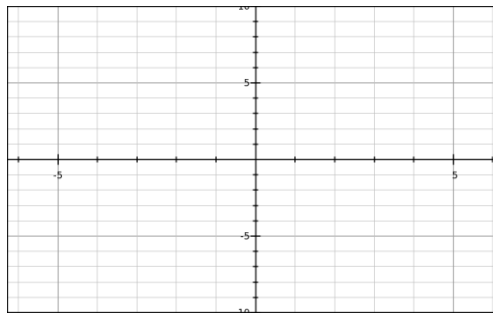
$\frac{1}{\sin \theta}$		
$\frac{1}{\cos \theta}$		
$\frac{1}{\tan \theta}$		

Sketch the graphs shown

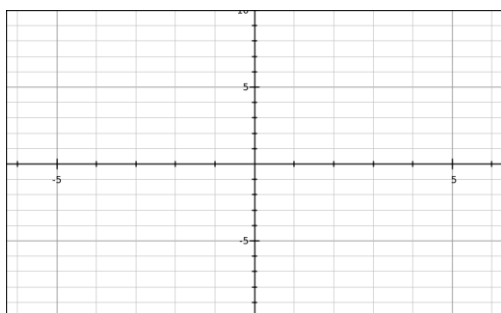
$$y = \sec x$$



$$y = \operatorname{cosec} x$$



$$y = \cot x$$



### C3 Pythagorean Identities

<https://youtu.be/VcDtYgSDvRs>

- Know all three Pythagorean trig identities
- Understand the proofs of all three Pythagorean identities
- Have experience of using the Pythagorean identities to prove identities and solve equations



Complete this table

$\sin^2 \theta + \cos^2 \theta =$	
$1 + \tan^2 \theta =$	
$1 + \cot^2 \theta =$	

Prove that  $\operatorname{cosec}^4 \theta - \cot^4 \theta \equiv \frac{1 + \cos^2 \theta}{1 - \cos^2 \theta}$

### C3 Chain Rule

<https://youtu.be/YLSm56Vla6U>

Be able to use the chain rule to differentiate compositions of polynomials, and trig functions



Differentiate  $(5x^3 - 2x)^6$

### C3:The Product Rule

<https://youtu.be/Jpg3QX5slg4>

- Know the product rule
- Be able to use the product rule to differentiate products of polynomials,  $\sin x$  and  $\cos x$



Differentiate  $x^4(2x^2 + 3x)^5$



### C3 The Quotient Rule

[https://youtu.be/n\\_vVxkhFKqk](https://youtu.be/n_vVxkhFKqk)

- Know the quotient rule
- Be able to use the quotient rule to differentiate products of polynomials and trig functions



What is the formula for the quotient rule?

Differentiate  $\frac{(x^2+5)^3}{4x}$

### C3: Differentiating trig functions

<https://youtu.be/kQ0lvJtXlgY>

- Know the derivatives of all six trig functions
- Be able to use the derivatives of trig functions to integrate
- Understand why  $x$  must be measured in radians when differentiating or integrating trig functions of  $x$



Complete this table

$y$	$\frac{dy}{dx}$
$\sin x$	
$\cos x$	
$\tan x$	
$\sec x$	
$\operatorname{cosec} x$	
$\cot x$	

When differentiating, you should measure angles using .....

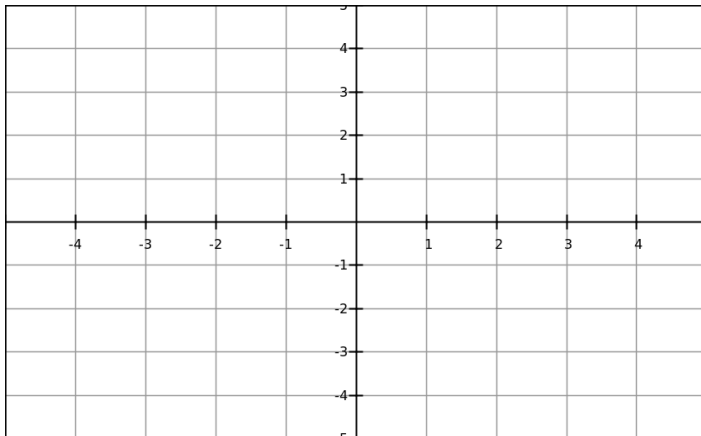
C3: Natural logarithms including derivatives of  $e^x$  and  $\ln x$

<https://youtu.be/cxtkmtQmhUY>



What is the value of  $e$ ?.....

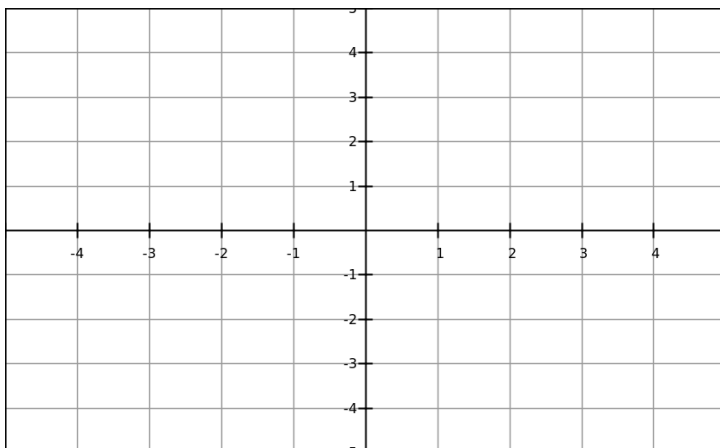
Sketch the graph of  $f(x) = e^x$



$e^4 = 54.598$  (3 d.p.) What is the gradient of the graph  $y = e^x$  at the point  $(4, 54.598)$ ? .....

If  $y = e^x$ , make  $x$  the subject of the equation  $x =$  .....

Sketch the graph of  $f(x) = \ln x$ .



### C3: The Compound Angle Formulae

<https://youtu.be/DyqQG7MzOPU>

- Know all three compound angle formulae
- Be able to prove the expansion of  $\tan(A \pm B)$  using the expansions of  $\sin(A \pm B)$ ,  $\cos(A \pm B)$
- Have experience of using the compound angle formulae to prove identities and solve equations
- Feel confident using the compound angle formulae to solve equations



Complete this table

$\sin(A \pm B) =$	
$\cos(A \pm B) =$	
$\tan(A \pm B) =$	

### C3: The Double Angle Formulae

[https://youtu.be/upki194kk\\_g](https://youtu.be/upki194kk_g)

- Know the double angle formulae
- Be able to prove the double angle formulae using the compound angle formulae and the half angle formulae using the formulae for  $\cos 2x$
- Have experience of using the double angle formulae to prove identities and solve equations



Complete this table

$\sin 2A$	
$\cos 2A$	
$\cos 2A$	
$\cos 2A$	
$\tan 2A$	

### C3: Factor formulae

<https://youtu.be/sHPEY10RSOE>

- The factor formulae



Complete this table

$\sin P + \sin Q$	
$\sin P - \sin Q$	
$\cos P + \cos Q$	
$\cos P - \cos Q$	

C4: Integration as the inverse of differentiation

<https://youtu.be/NRZJw-FtuSA>



Work out  $\int (2x + 3)^4 dx$

C3: Trig consolidation (solving equations)

<https://youtu.be/zk8Bled7bFc>



Solve the equation  $4 \operatorname{cosec}^2 \theta - 9 = \cot \theta$