Skills from previous math classes that you need to self-review for Math 1C

From Algebra:

Negative and fractional exponents Rational expressions Add / subtract Polynomial long division

From Trigonometry:

Sine / cosine / tangent of special angles on unit circle Inverse sine / cosine / tangent of special values Pythagorean / reciprocal / quotient / negative angle / co-function identities Double angle identity Trigonometric equations

From Precalculus:

<mark>Graphs</mark>	of basic functions (domain,	range, intercepts, asymptotes, long run behavior)
	Power	$y = x^n$ (<i>n</i> could be positive or negative, even or odd or reciprocal of integer)
	Exponential	$y = b^x$ (b could be greater than or less than 1)
	Logarithmic	$y = \log_b x$ (b could be greater than or less than 1)
	Trigonometric	$y = \sin x$, $y = \cos x$, $y = \tan x$
~ .		

Graphs of basic conics

Circles / ellipses / parabolas / hyperbolas

Symmetry of functions & graphs (relationship between algebraic & graphical symmetry) Even / odd

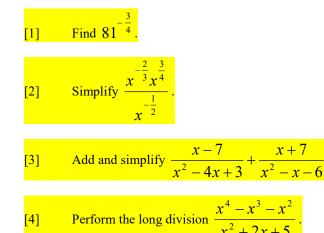
Sequences

General formula Sigma notation for series Factorials

From Calculus:

Limits (especially involving infinity) Continuity Derivatives (and their relationship to increasing/decreasing behavior of functions) Linear approximations L'Hospital's rule Anti-derivatives (basic, substitution, by parts) Improper integrals

You must be able to solve these using neither your calculator nor any external aid All answers must be completely simplified



- [5] Determine algebraically if $f(x) = x\sqrt{1+x^2}$ is symmetric about the y-axis, about the origin or neither.
- [6] Determine algebraically if $f(x) = \sin x \cos x$ is even, odd or neither.
- [7] Fill in the following table with all <u>function</u> values (in radians) that have exact values. (Some entries have values which can only be found using a calculator. Mark those as "NEED CALC".) Also, identify the entries which do not exist (ie. have no function value).

<u>x</u> =	$-\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{3}}{3}$	$-\frac{\sqrt{2}}{2}$	<mark>-√3</mark>	$-\frac{1}{2}$	<u>-1</u>	0	1	$\frac{1}{2}$	<mark>√3</mark>	$\frac{\sqrt{2}}{2}$	$\frac{\sqrt{3}}{3}$	$\frac{\sqrt{3}}{2}$
$\tan^{-1} x =$													
$\cos^{-1}x =$													
$\sin^{-1}x =$													

- [8] Let $\theta = \frac{\pi}{7}$.
 - [a] Find an angle with positive measure that is co-terminal with θ .
 - [b] Find an angle with negative measure that is co-terminal with θ .
 - [c] Find 3 angles between 0 and 2π that have θ as their reference angle, not including θ itself.
- [9] State the following trigonometric identities.
 - [a] the 3 Pythagorean identities that involve the 6 trigonometric functions
 - [b] the co-function identities for each of the 6 trigonometric functions
 - [c] the double angle identities for $\cos 2x$ (3 versions) and $\sin 2x$
- [10] Simplify $\sin(x-\pi)$.
- [11] Simplify $\cos(2\pi x)$.
- [12] Find all solutions of $1 + 2\cos x = 0$, where $0 \le x \le 2\pi$.

[13] Find all solutions of
$$\sin 2x = -\frac{\sqrt{3}}{2}$$
.
[14] Sketch the general shape and position of the following graphs. Do not worry about specific $x - \text{ and } y - \text{ coordinates.}}$
 $y = x^5$ $y = x^{-1}$ $y = x^{\frac{1}{2}}$
 $y = e^x$ $y = 0.5^4$
 $y = \ln x$ $y = \log_{0.4} x$
 $y - \sin x$ $y = \cos x$ $y = \tan x$
 $4x^2 + 4y^2 = 36$ $4x^2 + 9y^2 = 36$ $4y^2 - x^2 = 36$ $4y^2 - x = 36$
[15] Write the series $\frac{3}{2^2 \cdot 4^9} - \frac{4}{3^2 \cdot 4^1} + \frac{5}{4^2 \cdot 4^2} - \frac{6}{5^2 \cdot 4^3} + \frac{7}{6^2 \cdot 4^4} - \frac{8}{7^2 \cdot 4^5}$ in sigma notation with a lower limit of summation of 1.
[16] Simplify $\frac{(2n-1)!}{(2n+1)!}$.
[17] Find $\frac{d^3}{dx^3} \arctan x$.
[18] Find $\frac{d^3}{dx^3} \cot^2 x$.
[19] If $f'(x) = (1-x)(2+x)^3(3-x)^2$, determine the intervals over which f is decreasing.
[20] Determine if $\int_{0}^{\pi} te^{-2t}dt$ converges or diverges. If it converges, find its value.
[21] Determine if $\int_{2}^{\pi} \frac{1}{x \ln x} dx$ converges or diverges. If it converges, find its value.
[22] Rewrite the expression $\frac{12(2^{3x-5})}{3^{2x-1}}$ in the form $a \cdot b^{\pi}$, where a and b are simplified constants, and the exponent of b is only the variable x .