# 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:**

Graphs of basic functions (domain, range, intercepts, asymptotes, long run behavior)

| | |
|---|---|
| Power | $y = x^n$ ($n$ 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 | $y = \sin x$, $y = \cos x$, $y = \tan x$ |

Parametric equations
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

[1] Find $81^{-\frac{3}{4}}$.

[2] Simplify $\dfrac{x^{-\frac{2}{3}}x^{\frac{3}{4}}}{x^{-\frac{1}{2}}}$.

[3] Add and simplify $\dfrac{x-7}{x^2-4x+3}+\dfrac{x+7}{x^2-x-6}$.

[4] Perform the long division $\dfrac{x^4-x^3-x^2}{x^2+2x+5}$.

[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 **function** 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).

| $x=$ | $-\frac{\sqrt{3}}{2}$ | $-\frac{\sqrt{3}}{3}$ | $-\frac{\sqrt{2}}{2}$ | $-\sqrt{3}$ | $-\frac{1}{2}$ | $-1$ | $0$ | $1$ | $\frac{1}{2}$ | $\sqrt{3}$ | $\frac{\sqrt{2}}{2}$ | $\frac{\sqrt{3}}{3}$ | $\frac{\sqrt{3}}{2}$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| $\tan^{-1}x=$ | | | | | | | | | | | | | |
| $\cos^{-1}x=$ | | | | | | | | | | | | | |
| $\sin^{-1}x=$ | | | | | | | | | | | | | |

[8] Let $\theta=\frac{\pi}{6}$.

[a] Find an angle with positive measure that is co-terminal with $\theta$.

[b] Find an angle with negative measure that is co-terminal with $\theta$.

[c] Find $3$ angles between $0$ and $2\pi$ that have $\theta$ as their reference angle, not including $\theta$ 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 $x-$ and $y-$ coordinates.

$y = x^5$ $\quad$ $y = x^{-4}$ $\quad$ $y = x^{\frac{1}{3}}$

$y = e^x$ $\quad$ $y = 0.5^x$

$y = \ln x$ $\quad$ $y = \log_{0.4} x$

$y = \sin x$ $\quad$ $y = \cos x$ $\quad$ $y = \tan x$

$4x^2 + 4y^2 = 36$ $\quad$ $4x^2 + 9y^2 = 36$ $\quad$ $4y^2 - x^2 = 36$ $\quad$ $4y^2 - x = 36$

[15] Write the series $\frac{3}{2^2 \cdot 4^0} - \frac{4}{3^2 \cdot 4^1} + \frac{5}{4^2 \cdot 4^2} - \frac{6}{5^2 \cdot 4^3} + \frac{7}{6^2 \cdot 4^4} - \frac{8}{7^2 \cdot 4^5}$ in sigma notation with a lower limit of summation of $1$.

[16] Simplify $\frac{(2n-1)!}{(2n+1)!}$.

[17] Sketch the curve defined by the parametric equations $\begin{aligned} x &= 2t - t^2 \\ y &= t^2 + 2 \end{aligned}$ for $-1 \le t \le 2$ by plotting points.

[18] Find $\frac{d^3}{dx^3} \arcsin x$.

[19] Find $\frac{d^3}{dx^3} \cot^2 x$.

[20] If $f'(x) = (1-x)(2+x)^3(3-x)^2$, determine the intervals over which $f$ is decreasing.

[21] Determine if $\int_0^\infty te^{-2t}\,dt$ converges or diverges. If it converges, find its value.

[22] Determine if $\int_2^\infty \frac{1}{x \ln x}\,dx$ converges or diverges. If it converges, find its value.

[23] Rewrite the expression $\frac{12(2^{3x-5})}{3^{2x-1}}$ in the form $a \cdot b^x$, where $a$ and $b$ are simplified constants, and the exponent of $b$ is only the variable $x$.

From your DeAnza College Math 1A/1B calculus textbook:

Section 2.2 29-37
Section 2.5 25-32
Section 2.6 15-24, 28-37
Section 3.Review 1-50 excluding implicit and hyperbolic
Section 3.10 1-6
Section 4.4 5-45
Section 4.9 1-20
Section 7.8 5, 9, 13, 19, 49, 51
Section 7.Review 1, 3, 4, 9, 41, 43, 71

**NOTE:**
There is no solution key for this prerequisite package since it only involves material that you have learned before.
You are encouraged to work together with your classmates, and to consult your old textbooks and notes.
Feel free to ask me to look over your solutions, or to direct you to relevant sections in your old textbooks.
However, I will not give solutions to any questions.