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

From Algebra:

Quadratic functions
- Graphing
- Factoring
- Quadratic formula
- Discriminant & its uses (roots, intercepts, factoring into reals, factoring into rationals)
- Completing the square

Negative and fractional exponents
Graphs of systems of inequalities
Rational expressions
- Add / subtract
- Polynomial long division

From Geometry:

Areas
- Triangles / parallelograms / trapezoids / circles / sectors

Similarity

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 / sum & difference of angles identities

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	$y = \sin x$, $y = \cos x$, $y = \tan x$, $y = \csc x$, $y = \sec x$ or $y = \cot x$
Inverse trigonometric	$y = \sin^{-1} x$, $y = \cos^{-1} x$ or $y = \tan^{-1} x$

Graphs of basic conics
- Circles / ellipses / parabolas

Single step transformations of functions & graphs (relationship between algebraic & graphical transformations)
- Horizontal / vertical
- Shift / reflect / stretch & compress

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

Sigma notation for series

From Calculus:

Limits (especially involving infinity)
Continuity
Derivatives
Linear approximations
L'Hopital's rule
Anti-derivatives

Unless stated otherwise, you must be able to solve these without your calculator

[1] Sktech $f(x) = x^2 - 6x - 16$ by finding the $x-$ and $y-$ intercepts and the vertex (without any additional points).

[2] Solve $3x^2 - 2x = 9$.

[3] Find the discriminant of $122x^2 - 111x + 25$. (Use your calculator.)
What does it tell you about the graph of $f(x) = 122x^2 - 111x + 25$?
What does it tell you about the roots of the equation $122x^2 - 111x + 25 = 0$?
What does it tell you about how $122x^2 - 111x + 25$ can be factored ?

[4] Complete the square for $-x^2 + 26x - 2$.

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

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

[7] Graph the solution set of $\begin{cases} 2x - y < 4 \\ x > y^2 - 1 \\ x < 0 \end{cases}$.

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

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

[10] Find the area of a sector of a circle of radius 8 with a central angle of 2 radians.

[11] Suppose D is a point on the line segment AB, and E is a point on the line segment AC, and suppose $DE \parallel BC$. If $AD = 2$, $DE = 4$, $BD = y$, $BC = x$, $AE = 5$ and $CE = z$, find a formula for y in terms of x.

[12] Find the area of the quadrilateral with vertices $(-6, -3)$, $(8, -3)$, $(-2, -9)$ and $(-8, -9)$.

[13] State the 3 Pythagorean identities that involve the 6 trigonometric functions.

[14] State the co-function identities for each of the 6 trigonometric functions.

[15] State the double angle identities for $\cos 2x$ (3 versions) and $\sin 2x$.

[16] If $\csc x = 4$ and $\cot x < 0$, find $\sec x$ using identities, **NOT TRIANGLES**.

[17] If $\sin x = \dfrac{1}{3}$ and $\cos y = \dfrac{2}{3}$, find $\sin(y - x)$ and $\cos(x + y)$.

[18] Fill in the following table with all entries that have exact values. Also, identify the entries which do not exist.

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

[19] Sketch the general shape and position of the following graphs. Do not worry about specific $x-$ and $y-$ coordinates.

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

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

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

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

$y = \sin^{-1} x$ $\quad$ $y = \cos^{-1} x$ $\quad$ $y = \tan^{-1} x$

$4x^2 + 9y^2 = 36$ $\quad$ $x^2 + y^2 - 6x + 8y = 0$

[20] The graph of $f(x)$ is shown on the right. Sketch the following graphs.

$y = f(x) - 2$

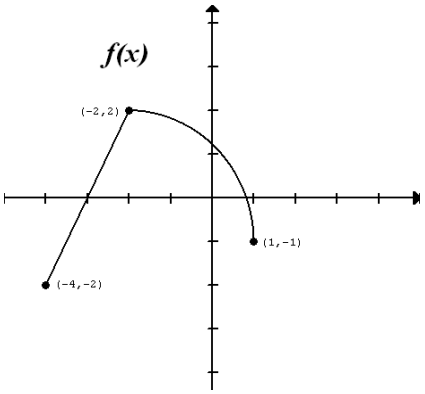
$y = f(x + 2)$

$y = f(2x)$

$y = 2f(x)$

$y = f(-x)$

$y = -f(x)$



[21] Determine algebraically if $f(x) = \tan x - \csc x$ is symmetric about the $y-$ axis, about the origin or neither.

[22] Determine algebraically if $f(x) = \sec x - \cot x$ is even, odd or neither.

[23] 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.

From your calculus textbook:

Section 2.2 25-32
Section 2.5 21-28
Section 2.6 15-21, 28-32
Section 3.Review 1-50 excluding implicit and hyperbolic
Section 3.10 1-6
Section 4.4 5-44
Section 4.9 1-20