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	$y = x^{n}$ (<i>n</i> could be positive or negative, even or odd or reciprocal of integer)
Exponential	$y = b^x$ (<i>b</i> could be greater than or less than 1)
Logarithmic	$y = \log_b x$ (<i>b</i> 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

<u>Unless stated otherwise, you must be able to solve these</u> <u>without your calculator</u>

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

$$2x - y < 4$$

[7] Graph the solution set of $x > y^2 - 1$. x < 0

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

- [9] Perform the long division $\frac{x^4 x^3 x^2}{x^2 + 2x + 5}$.
- [10] Find the area of a sector of a circle of radius 8 with a central angle of 2 radians.
- [11] Suppose $DE \parallel BC$ in the diagram on the right. 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
$$\sin x = \frac{1}{3}$$
 and $\cos y = \frac{2}{3}$, 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.

<i>x</i> =	$-\frac{\sqrt{3}}{2}$	$-\frac{\sqrt{3}}{3}$	$-\frac{\sqrt{2}}{2}$	$-\sqrt{3}$	$-\frac{1}{2}$	-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.

$y = x^5$	$y = x^{-4}$	$y = x^{\frac{1}{3}}$
$y = e^x$	$y = 0.5^{x}$	
$y = \ln x$	$y = \log_{0.4} x$	
$y = \cos x$	$y = \tan x$	$y = \csc x$
$y = \sin^{-1} x$	$y = \cos^{-1} x$	$y = \tan^{-1} x$
$4x^2 + 9y^2 = 36$	$x^2 + y^2 - 6x + 8y = 0$	

[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