Math1B - Practice Final

1. solve for x exactly, $\ln(x+4) - \ln(x-4) = 2\ln 3$.

2. Find the exact degree measure of
(A) $\sin^{-1}(-\frac{1}{2})$;
(B) $\arccos(-\frac{1}{2})$;
(C) $\cos[\sin^{-1}(-\frac{4}{5})]$.

3. Verify each identity,
   (A) $\tan x + \cot x = \sec x \csc x$;
   (B) $\cos 2x = \frac{1-\tan^2 x}{1+\tan^2 x}$.

4. Evaluate exactly
   (A) $\cos 195^o \sin 75^o$;
   (B) $\cos 195^o + \cos 105^o$.

5. Solve exactly fox x, $2\sin^2 x + \cos x = 1, \quad 0 \leq x \leq \pi$.

6. Solve the triangle, $a = 12, c = 13, \beta = 121^{o}$.

7. Find S_∞ for the geometric series $108 - 36 + 12 - 4 + \cdots$.

Formulas

$\sin(x+y) = \sin x \cos y + \cos x \sin y;$ $\quad \sin(x-y) = \sin x \cos y + \cos x \sin y;$
$\cos(x+y) = \cos x \cos y - \sin x \sin y;$ $\quad \cos(x-y) = \cos x \cos y - \sin x \sin y;$
$\sin 2x = 2 \sin x \cos x;$ $\quad \cos 2x = \cos^2 x - \sin^2 x = 1 - 2\sin^2 x = 2\cos^2 x - 1;$
$\sin \frac{x}{2} = \pm\sqrt{\frac{1-\cos x}{2}};$ $\quad \cos \frac{x}{2} = \pm\sqrt{\frac{1+\cos x}{2}};$
$\sin x \cos y = \frac{1}{2}[\sin(x+y) + \sin(x-y)];$ $\quad \cos x \sin y = \frac{1}{2}[\sin(x+y) - \sin(x-y)];$
$\sin x \sin y = \frac{1}{2}[\cos(x-y) - \cos(x+y)];$ $\quad \cos x \cos y = \frac{1}{2}[\cos(x+y) + \cos(x-y)];$
$\sin x + \sin y = 2 \sin \frac{x+y}{2} \cos \frac{x-y}{2};$ $\quad \sin x - \sin y = 2 \cos \frac{x+y}{2} \sin \frac{x-y}{2};$
$\cos x + \cos y = 2 \cos \frac{x+y}{2} \cos \frac{x-y}{2};$ $\quad \cos x - \cos y = -2 \sin \frac{x+y}{2} \sin \frac{x-y}{2}.$
Law of Sine: $\frac{a}{\sin\alpha} = \frac{b}{\sin\beta} = \frac{c}{\sin\gamma};$
Law of Cosine: $a^2 = b^2 + c^2 - 2bc\cos\alpha;$
$b^2 = a^2 + c^2 - 2ac\cos\beta;$
$c^2 = a^2 + b^2 - 2ab\cos\gamma.$
Arithmetic Sequence: $a_n = a_1 + (n-1)d, \quad S_n = \frac{n[2a_1+(n-1)d]}{2};$
Geometric Sequence: $a_n = a_1 r^{n-1}, \quad S_n = \frac{a_1 - a_1 r^n}{1-r}, \quad S_\infty = \frac{a_1}{1-r}, if |r| < 1.$