Chaparral High School
Algebra II$^+$ Review for Exam Chapter 14

This is a 50 minute exam to be completed without the aid of calculators. Please show all appropriate work and place answers in lowest terms. Please work independently. This exam will be scaled to 100 points. Good Luck! Note the exam will contain many problems similar to the ones given below. There may be other problems included as well. Work answers out on a calculator for the review sheet, but leave them in exact form for the exam.

1) **Section 14.1** (5 points) Simplify the expression given below.

$$\frac{\cos\theta}{1+\sin\theta}+\frac{1+\sin\theta}{\cos\theta}$$

2) **Section 14.1** (5 points) Prove the identity given below.

$$\frac{1-\sin^2\theta}{1+\cot^2\theta}=\sin^2\theta\cos^2\theta$$

3) **Section 14.2** (6 points) Solve the equation below.

$$2\cos^2 x-\cos x=2-\sec x$$

4) **Section 14.2** (6 points) Determine all solutions to the equation given below. Express your answers in radian measure.

$$2\cos^2 x-\sin x-1=0$$

5) **Section 14.3** (4 points) In $\triangle ABC$, $\angle A=90°$, $\angle B=25°$, and $a=18$. Find b and c.
6) **Section 14.3** (4 points) A rectangle is 5in high and 10in long. Find the measure of the acute angle between its diagonals.
7) **Section 14.4** (5 points) Find the area of $\triangle ABC$ if $\angle A=99.37°$, $a=21$, $b=16.7$, and $c=10.3$.
8) **Section 14.4** (5 points) Solve the triangle $\triangle ABC$ if $\angle A=38°$, $\angle B=63°$, and $c=15$.
9) **Section 14.5** (5 points) Solve the triangle $\triangle ABC$ if $a=20$, $b=12$, and $c=28$.
10) **Section 14.5** (5 points) Solve the triangle $\triangle ABC$ if $\angle A=53°$, $b=40$, and $c=49$.
11) **Section 14.6** (5 points) Find $\cos(\alpha-\theta)$ if the following conditions are true.
$\sin\alpha=\frac{12}{13}$ where $\frac{\pi}{2}<\alpha<\pi$
$\cos\theta=\frac{7}{25}$ where $-2\pi<\theta<-\frac{3\pi}{2}$
12) **Section 14.6** (4 points) Use the formula for $\sin(x-y)$ to find the exact value of $\sin\frac{\pi}{12}$.
13) **Section 14.7** (4 points) Use a half-angle formula to evaluate $\cos\frac{\pi}{8}$.

14) **Section 14.7** (4 points) Find $\tan(2\theta)$ if $\cos\theta=-\frac{1}{3}$ and where $180°<\theta<270°$.

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1. $\sin(\alpha\pm\beta)=\sin\alpha\cos\beta\pm\sin\beta\cos\alpha$
2. $\cos(\alpha\pm\beta)=\cos\alpha\cos\beta\mp\sin\alpha\sin\beta$
3. $\tan(\alpha\pm\beta)=\frac{\tan\alpha\pm\tan\beta}{1\mp\tan\alpha\tan\beta}$
4. $\sin 2\alpha=2\sin\alpha\cos\alpha$
5. $\cos 2\alpha=\cos^2\alpha-\sin^2\alpha=2\cos^2\alpha-1=1-2\sin^2\alpha$
6. $\tan 2\alpha=\frac{2\tan\alpha}{1-\tan^2\alpha}$
7. $\sin\frac{\alpha}{2}=\pm\sqrt{\frac{1-\cos\alpha}{2}}$ (determine whether it is + or - by finding the quadrant that $\frac{\alpha}{2}$ lies in)
8. $\cos\frac{\alpha}{2}=\pm\sqrt{\frac{1+\cos\alpha}{2}}$ (same as above)
9. $\tan\frac{\alpha}{2}=\frac{1-\cos\alpha}{\sin\alpha}=\frac{\sin\alpha}{1+\cos\alpha}$