1. (**10pts**)

   (a) If particle travels along a circle of radius 3 centered at $(0, 0)$, at a speed of 1200π radians per second. How long will it take the particle to make 5 rotations? Write your answer in seconds

   (b) If the particle's initial position is 6'O clock (the point located at the lowest end of the circle) and if the particle is moving clockwise, find the position i.e the coordinates of the particle after $\frac{1}{4}$ seconds.

2. (**10pts**) Without using a calculator find the exact value for the followings:

$$\frac{\tan(-11\pi/4)\cos(\pi)}{\cos(\pi/6)}.$$

You must simplify your answer as much as possible and rationalize the denominator if possible as well.

3. (**10pts**)If $\tan(A+B)=3$ and $\tan(B)=1/2$, find $\tan(A)$

4. (**10pts**) *A problem from webwork.* A ferris wheel is 80 meters in diameter and boarded at its lowest point (6 OClock) from a platform which is 15 meters above ground. The wheel makes one full rotation every 20 minutes, and at time $t = 0$ you are at the highest point on the ferris wheel (at 12 OClock). Let $h = f(t)$ denote your height above ground in meters after t minutes.

   (a) Find the period of the function $f(t)$.

   (b) Find the amplitude of the function $f(t)$. **Hint**: amplitude = highest value minus midline value.

5. (**10pts**) Without the use of a calculator find the exact value of $\csc[\arctan(-1)]$.

6. (**10pts**)Prove the following identity

$$\frac{1}{1-\sin(x)} + \frac{1}{1+\sin(x)} = 2(\sec(x))^2.$$

7. (**10pts**) Using trig summation identities, show that the following is true

$$\cos(x + 2\pi) = \cos(x).$$

8. (**10pts**) Without using a calculator, find the exact value of

$$\sin(\arcsin(3/5) + \arctan(1)).$$

9. (**10pts**)

(a) Using the half angle formula for sine and cosine and without the use of a calculator, find the exact value for

$$\cos(\frac{17\pi}{12}) + \sin(\frac{\pi}{12}).$$

(b) Without the use of a calculator, compute the exact value for:

$$\sin(\arcsin(1/2) + \arccos(1/2)).$$

10. (**10pts**) Without using a calculator, solve the following equation on the interval $[0, 2\pi)$:

$$\cos^2(x) = \frac{1}{81}.$$

You must find all the exact values, any approximation or calculator answer will not be accepted.