

MHF 4U1 – Problem Set # 33 – Trig Functions I Review

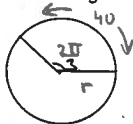
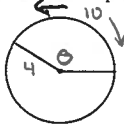
1. Convert the following from radians to degrees:

a) $\frac{7\pi}{4}$ b) $\frac{5\pi}{2}$ c) $\frac{11\pi}{6}$ d) $\frac{5\pi}{3}$ e) $-\frac{9\pi}{4}$ f) $-\frac{13\pi}{6}$ g) 3.2 h) -21

2. Convert the following from degrees to radians:

a) 330 b) 225 c) -315 d) 210 e) 405 f) -480 g) -135 h) 72

3. Find the indicated quantity in the following:



4. A wheel turns at 100 rev/min.

- c) What is its angular velocity in radians per second?
d) How far will a point 15 cm from the point of rotation travel in 4 seconds?

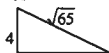
5. A ferris wheel with radius 28 m makes 3 rotations in 2 minutes.

- a. Find the angular velocity in radians per second.
b. How far has a rider travelled if the ride is 8 min long?

6. A satellite with a circular orbit has an angular velocity of 0.005 rad/s.

- c. How long will it take to make 1 orbit?
d. What is the satellite's speed if it is orbiting 1000 km above the earth (radius 6400km)?

7. Find the 6 primary trig ratios for angle A:



8. If $\cot \theta = \frac{7}{24}$ and θ is acute what are the other 5 ratios?

9. Find the exact value of the following:

a) $\cos \frac{5\pi}{3}$ b) $\sin \frac{5\pi}{6}$ c) $\tan \frac{7\pi}{3}$ d) $\cot \frac{-9\pi}{4}$ e) $\csc \frac{11\pi}{6}$ f) $\sec(-11\pi)$ g) $\sin\left(-\frac{7\pi}{4}\right)$ h) $\cos \frac{-11\pi}{2}$

10. Find the exact value of: $\cos^2\left(\frac{4\pi}{3}\right)\sin \frac{\pi}{6} - \sin^2\left(\frac{11\pi}{4}\right)\sec \frac{\pi}{3}$

11. Graph the following:

a) $y = -\sin 3\left(\theta - \frac{\pi}{2}\right) - 1 \quad (-\pi \leq \theta \leq \pi)$ b) $y = -\frac{1}{2}\cos\left(\theta + \frac{\pi}{3}\right) + 2 \quad (-\pi \leq \theta \leq 2\pi)$
c) $y = 2\sin\left(\frac{\theta}{2} - \frac{\pi}{12}\right) - 3 \quad (-2\pi \leq \theta \leq 2\pi)$ d) $y = 3\cos\left(2\theta - \frac{\pi}{2}\right) + 1 \quad (-\pi \leq \theta \leq \pi)$

12. What is the equation of:

- a) a flipped cosine function with a period of $\frac{2\pi}{3}$, shifted right $\frac{\pi}{2}$, and up 4
b) a sine function with amplitude 5, period $\frac{4\pi}{3}$, shifted left $\frac{\pi}{4}$ and down 3

13. A ferris wheel has a 30 m diameter and rotates once every 28s. The lowest seat is 2m off the ground. Find a sine equation for the graph of the height vs time:

- a) based on starting at a point level to the centre of the wheel
b) based on starting at the lowest point on the wheel

14. A mass on a spring bounces up and down relative to a marked spot on the wall. The mass gets to a max height of 8 cm above the spot and a min of 2 cm below the spot and it takes 3s to complete 4 cycles of this sinusoidal pattern.

- a) Draw a graph of the height vs time assuming the start is at a midpoint between the high and low.
b) Create an equation for your graph.