Mathematics 1710 Exercise Set Number 11

1. From the graph in figure 1 deduce the period, the amplitude. What is the equation that describes the graph?

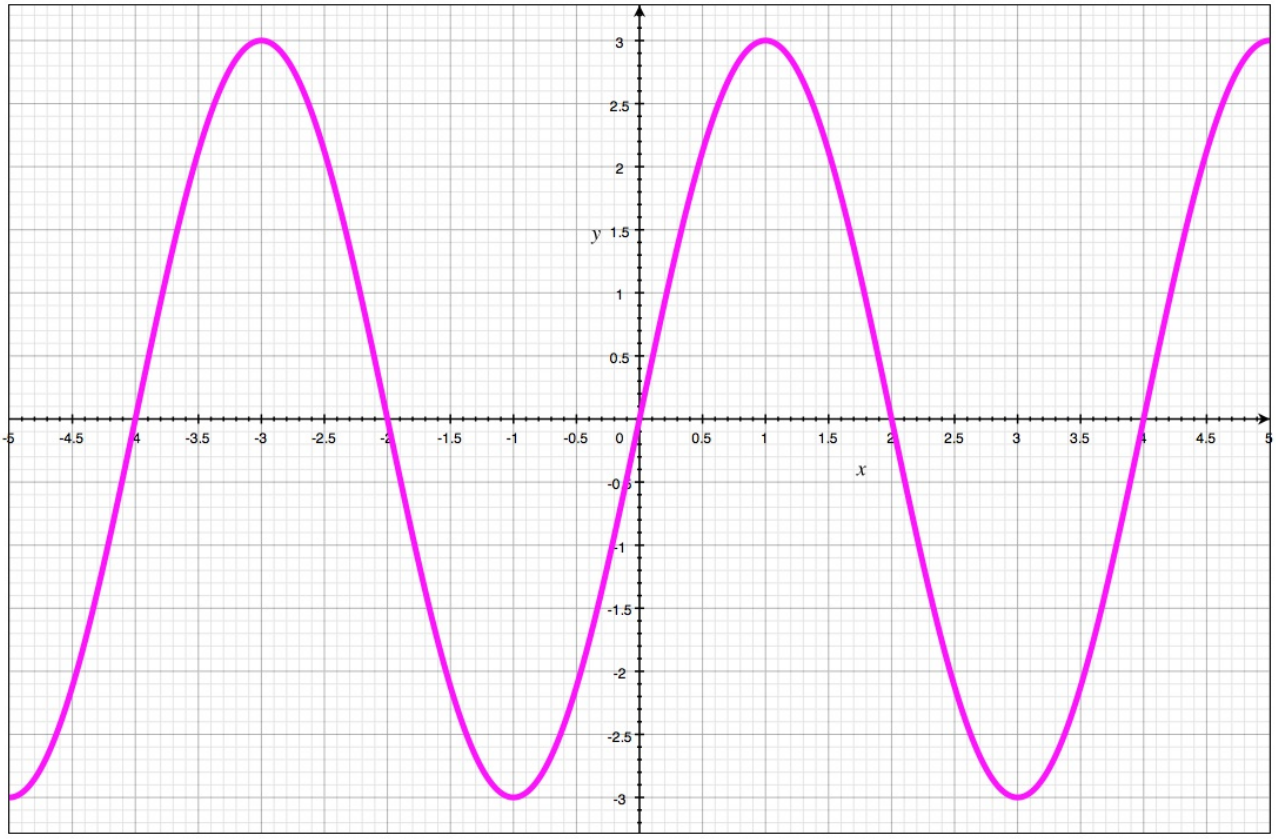

Figure 1: Find the equation

2. From Stewart, et al. p.445, a mass is suspended on a spring . The spring is compressed so that the mass is located 5 cm above its rest position. The mass is released at time $t = 0$ and allowed to oscillate. It is observed that the mass reaches its lowest point $\frac{1}{2}$ second after it is released. Find an equation that describes the motion of the mass, assuming no dampening effect.

3. For each of the following, with the given information find the value of the trigonometric functions of θ

(a) $\sin\theta = \frac{3}{5}$ and θ is in quadrant II

(b) $\tan\theta = 4$ and $\sin\theta > 0$

4. Find the area of the triangle with sides of length 6 and 10 and included angle 55^o.

5. Evaluate each of the following by first sketching an appropriate triangle

   (a) $\cos(\tan^{-1} 5)$

   (b) $\cot(\sin^{-1} \frac{2}{3})$

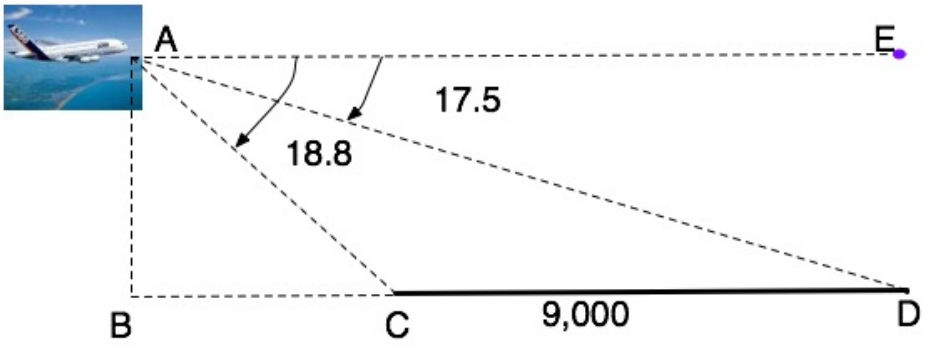

Figure 2: Landing a plane

6. The pilot of an Airbus 380 has begun his approach to the runway at Pearson airport. The runway is 9,000 feet in length. The angle of depression from the plane to the far end of the runway is 17.5^o and to the near of the runway it is 18.8^o. See figure 2.

   - Find the air distance the plane must travel until touching down at the near end of the runway.
   - Find the ground distance the plane must travel until touch down
   - Find the altitude of the plane when the pilot begins the descent.

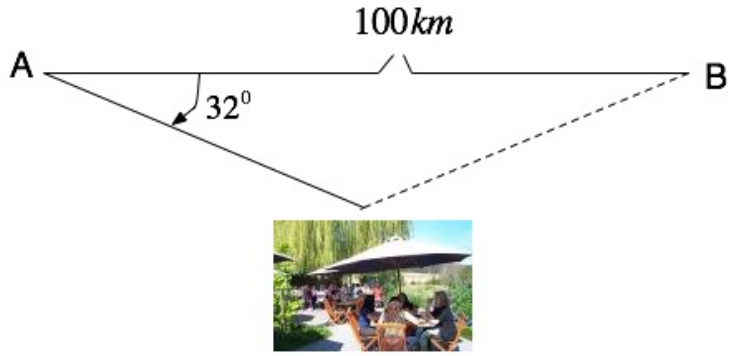

Figure 3: Find distance from Cafe to B

7. A motorist is trying to get from point A to point B in central Saskatchewan which happens to be exactly 100 km due east of point A along a straight highway. Unfortunately the road has been closed due to flooding and she is obliged to take a secondary road which heads straight at an angle of 32^o toward the south east. She is able to travel at a constant speed of 40 km/hr, and after 1 hour she arrives at Sally's Cafe where she stops for a drink and where there is a junction with another straight road that leads to point B. How far is Sally's Cafe from point B? See figure 3.

8. A pole 30 feet high is situated on level ground and is supported by a cable attached to the top that is anchored 35 feet from the base of the pole. What angle does the wire make with the ground?