

By providing my signature below I acknowledge that I abide by the University's academic honesty policy. This is my work, and I did not get any help from anyone else during the exam:

Name (sign): \_\_\_\_\_

Name (print): \_\_\_\_\_

Student Number: \_\_\_\_\_

Instructor's Name: \_\_\_\_\_

Class Time: \_\_\_\_\_

Problem Number	Points Possible	Points Made
1	0	
2	15	
3	15	
4	20	
5	10	
6	10	
7	15	
8	15	
Total:	100	

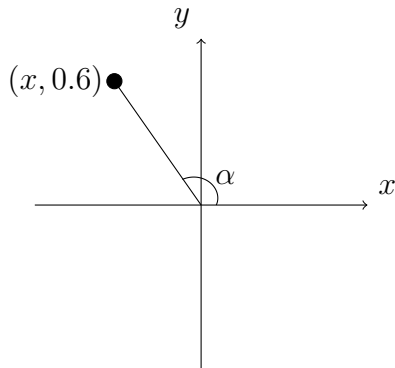
- If you need extra space use the last page.
- Please show your work. **An unjustified answer may receive little or no credit.**
- If you make use of a theorem to justify a conclusion then state the theorem used by name.
- Your work must be **neat**. If I can't read it (or can't find it), I can't grade it.
- The total number of possible points that is assigned for each problem is shown here. The number of points for each subproblem is shown within the exam.
- Please turn off your mobile phone.
- A calculator is not necessary, but numerical answers should be given in a form that can be directly entered into a calculator.
- Common identities:

$$\begin{aligned}\cos(\alpha + \beta) &= \cos(\alpha)\cos(\beta) - \sin(\alpha)\sin(\beta), \\ \sin(\alpha + \beta) &= \sin(\alpha)\cos(\beta) + \cos(\alpha)\sin(\beta).\end{aligned}$$

1. [2 Bonus] Common Knowledge: Will Kristen Faulkner make it to the podium for a major race this year, and if so which one?

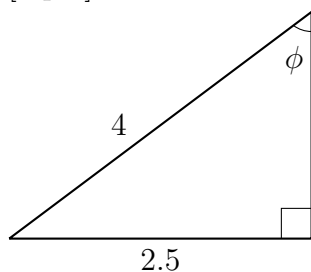
2. Determine the values of the requested quantities in each question below. Numerical values should be to within 0.01 of the true value. **(All angles are given in radians and should be expressed in radians if you have to determine their value.)**

- \_\_\_\_\_ (a) [5 pts] Determine the radian measure of the angle  $\alpha$  in the diagram below where the point  $(x, 0.6)$  is on the unit circle:



- \_\_\_\_\_ (b) [5 pts] The area of a sector is  $0.3 \text{ m}^2$ , and the angle subtending the arc,  $\beta$ , is 2.5 radians. Determine the radius of the sector.

- \_\_\_\_\_ (c) [5 pts] Determine the sine, cosine, and tangent of the angle  $\phi$  in the diagram below.



3. Determine the values of the requested quantities in each question below. Numerical values should be to within 0.01 of the true value. **(All angles are given in radians and should be expressed in radians if you have to determine their value.)**

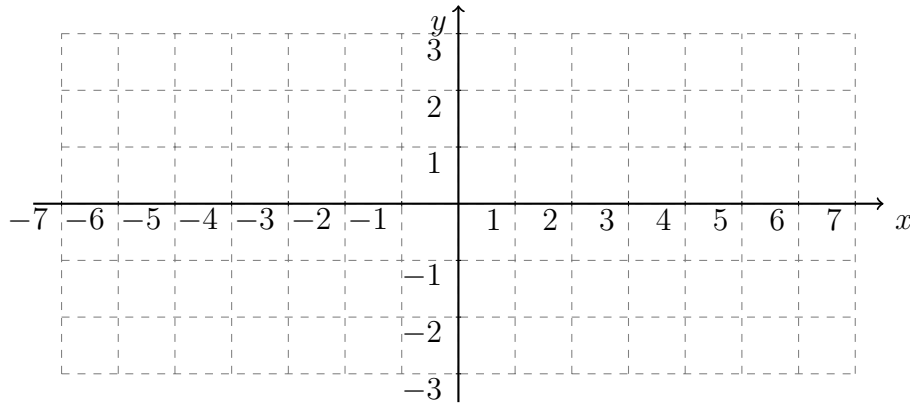
\_\_\_\_\_ (a) [5 pts] Determine the cosine of the angle in the third quadrant whose sine is -0.3.

\_\_\_\_\_ (b) [5 pts] Determine an approximation of  $\theta$  where  $\sin(\theta) = 0.3$ , and  $\theta$  is in the first quadrant.

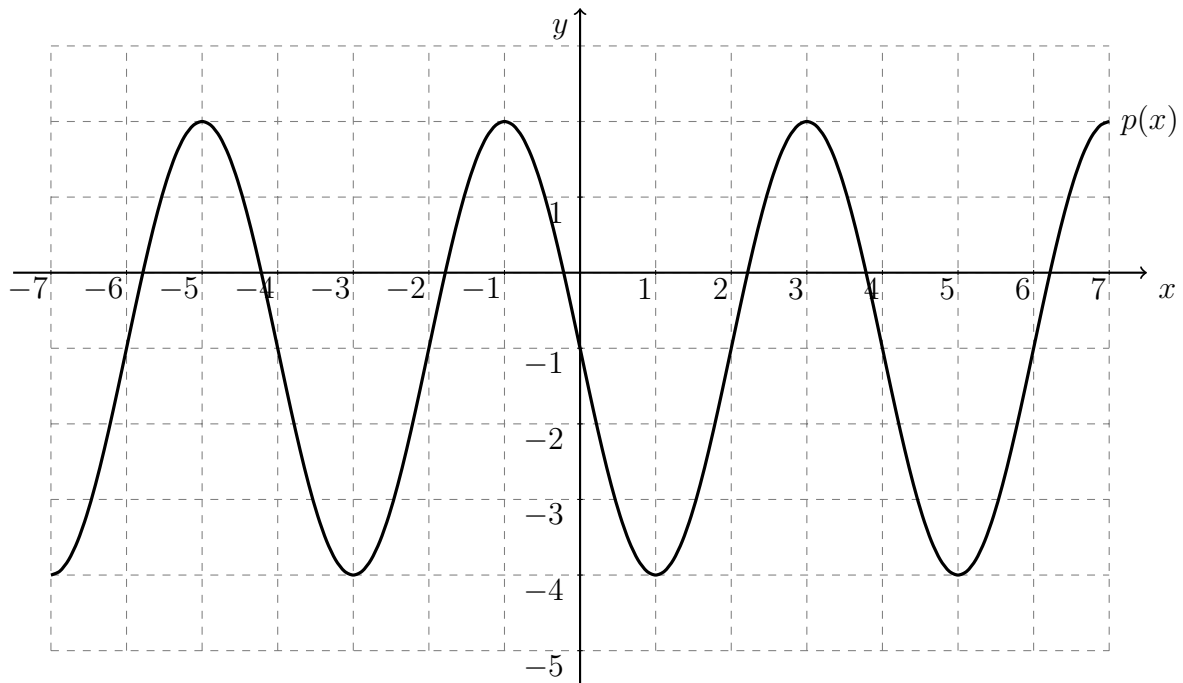
\_\_\_\_\_ (c) [5 pts] Determine an approximation of  $\theta$  where  $\cos(\theta) = -0.6$ , and  $\theta$  is in the third quadrant.

4. (a) [10 pts] Use the axes below to make a sketch of the graph of the function

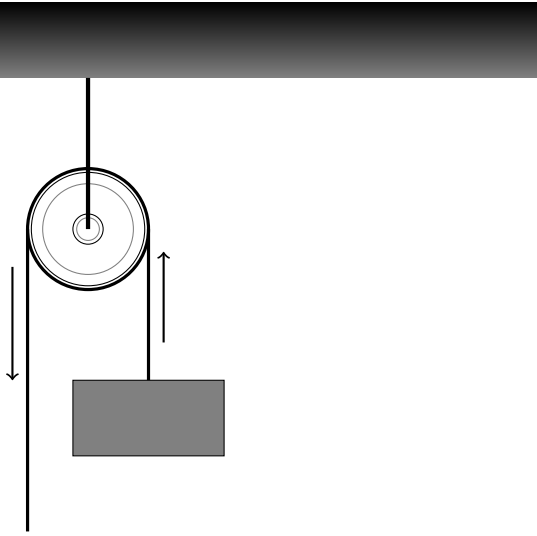
$$l(x) = 2 \cos\left(\frac{\pi}{4}x\right) + 1$$



- (b) [10 pts] Express the function whose graph is shown below as a cosine function.



5. [10 pts] A pulley has a diameter of 20 cm. It will be used to pull a load upwards. If the pulley turns  $600^\circ$  what distance will the object move?



6. [10 pts] The sine of one radian is approximately 0.84. Determine two other angles between 0 and  $2\pi$  whose sine is -0.84.
- \_\_\_\_\_

7. [15 pts] Verify the following identity,

---

$$\frac{\cos(\theta)}{\tan(\theta) + \sec(\theta)} = 1 - \sin(\theta).$$

8. [15 pts] Sir Edmund Hillary is standing between two peaks, Mount Dampier and Mount Vancouver. It is estimated that the two peaks are the same height. Sir Hillary is standing in a line directly between the two peaks, and he estimates that his distance to a point directly below the peak of Mount Dampier at his same altitude is seven hundred meters more than the distance to the equivalent point below Mount Vancouver. When looking at Mount Dampier he estimates the angle of elevation is  $41.6^\circ$ , and his angle of elevation for Mount Vancouver is  $69.4^\circ$ . What is the elevation of the two peaks above Sir Hillary's current elevation?



Extra space for work. **Do not detach this page.** If you want us to consider the work on this page you should print your name, instructor and class meeting time below.

Name (print): \_\_\_\_\_ Instructor (print): \_\_\_\_\_ Time: \_\_\_\_\_