

MATH 120A
Exam 2
Version 1
February 25, 2003

Name _____

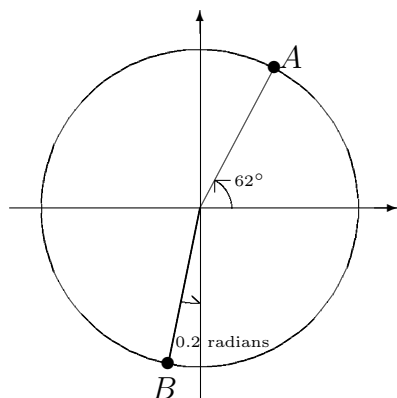
Section _____

1	8	
2	10	
3	8	
4	10	
5	14	
Total	50	

- You are allowed to use a calculator and one sheet of hand-written notes.
- Complete all questions.
- Show all your work and clearly indicate your final answer.
- When rounding is necessary, you may round your **final answer** to two digits after the decimal.
- Give answers with appropriate units.
- Raise your hand if you have a question.
- You have 50 minutes to complete the exam.

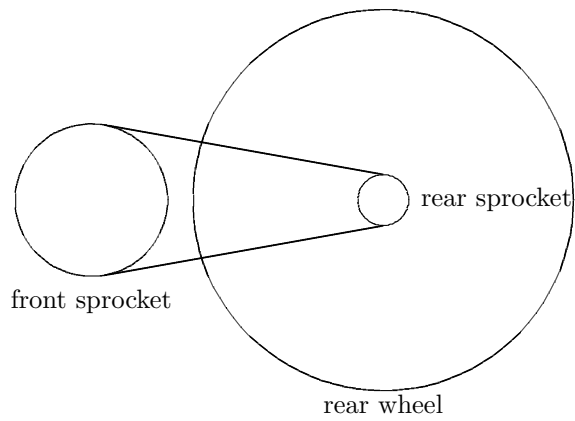
GOOD LUCK!

1. (8 points) In the figure, the circle has radius 10 inches. Calculate the coordinates of the points A and B .



ANSWER: A : _____, B : _____

2. (10 points) You are riding a bicycle along a level road. The front sprocket has radius 5 inches and the rear sprocket has radius 2.5 inches. You pedal, turning the front sprocket 85 RPM, as the bicycle travels at a rate of 26.4 feet per second. What is the radius of the rear wheel in inches?



ANSWER: _____ inches

3. (8 points) Let

$$f(x) = \begin{cases} 1 & \text{if } x < -1 \\ 2 - x^2 & \text{if } -1 \leq x \leq 1 \\ x & \text{if } x > 1 \end{cases}$$

and

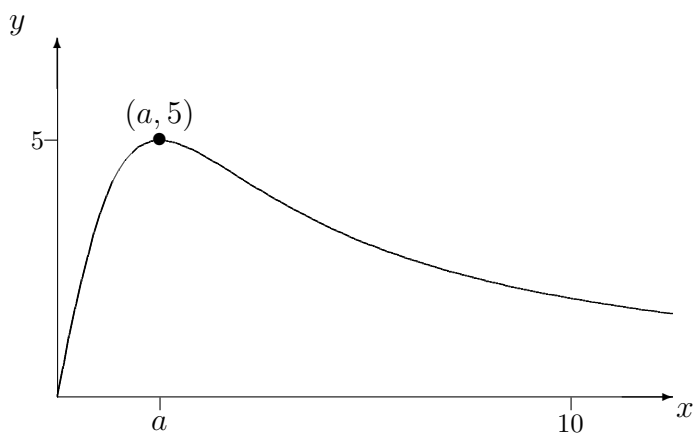
$$g(x) = |x| = \begin{cases} -x & \text{if } x < 0 \\ x & \text{if } x \geq 0. \end{cases}$$

Give the multipart rule for the function

$$h(x) = f(x) + g(x).$$

Please circle your final answer.

4. (10 points) The graph of $y = f(x) = \frac{20x}{x^2 + 4}$ is given below.



- (a) The maximum value of $f(x)$ is 5. Find the value of the number a in the picture. (As always, you must show work for credit.)

ANSWER: $a =$ _____

- (b) If we restrict the domain of $f(x)$ to the interval $a \leq x \leq 10$, then the resulting function is one-to-one. Find the domain of $f^{-1}(x)$ under this restriction. (As always, you must show work for credit.)

ANSWER: domain of $f^{-1}(x)$: _____

5. (14 points) Genny bakes pies. The secret to success is to use a special oven whose temperature varies according to a sinusoidal function. Genny puts the pie in the oven (at time $t = 0$ minutes) when the temperature is approximately 410° F and falling. After 10 minutes, the oven hits its minimum temperature of 375° F for the first time. Genny takes the pie out of the oven after 90 minutes, when the juices are bubbling, the crust is nut brown, and the oven is at its maximum temperature of 425° F for the third time.

- (a) The oven temperature after t minutes can be written in the form

$$T(t) = A \sin \left[\frac{2\pi}{B}(t - C) \right] + D.$$

Give the values of A , B , C , and D .

ANSWER: $A =$ _____ $B =$ _____
 $C =$ _____ $D =$ _____

- (b) How many minutes during the baking time is the oven temperature at least 390° F?

ANSWER: _____ minutes