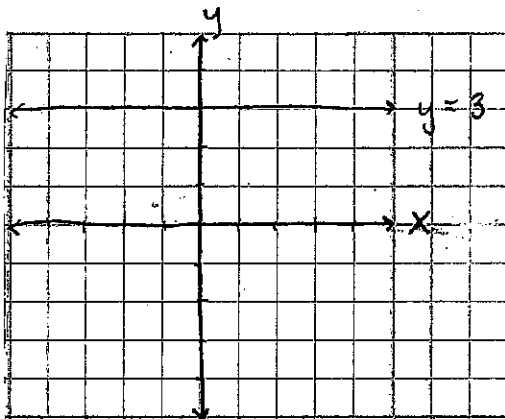


Group Members: \_\_\_\_\_

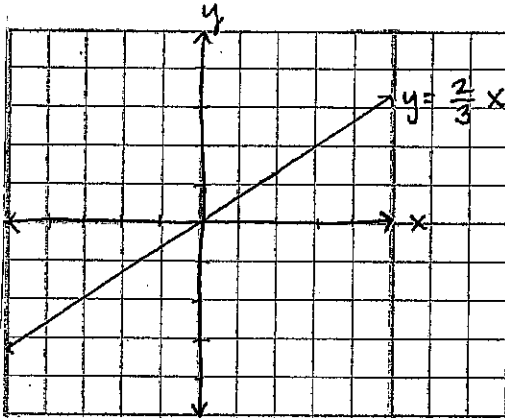
**Instructions:** Working in a group of 3-4 people, explore different ways to approximate the area enclosed by the  $x$ -axis and a curve. Write your explanations so that someone who has completed only Math 1 will be able to understand them. Each group should submit one paper, and group members should find a way to ensure that the work is distributed equally. You should provide answers to all of the questions below. Write-ups should include complete sentences, but do **not** need to be typed (however, they must be legible). If you have room, you may write your explanations on this sheet (otherwise you may attach extra sheets to this packet). Write-ups are due in class on **Wednesday, January 18**. If you will not be in class that day, please arrange to turn in your write-up before class.

1. graph 1



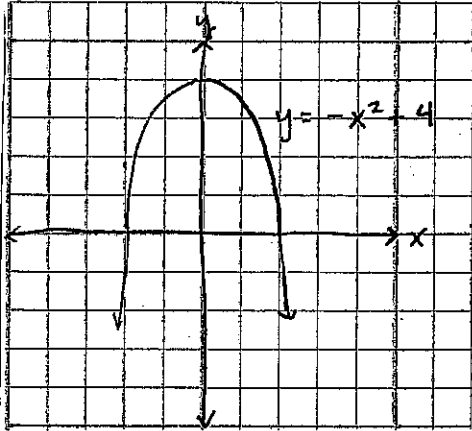
- Find the area enclosed by the lines  $y = 0$ ,  $y = 3$ ,  $x = -2$  and  $x = 2$ .
- Describe both graphically and algebraically how you arrived at your answer.

2. graph 2



- (a) Approximate the area enclosed by the lines  $y = 0$ ,  $y = \frac{2}{3}x$ ,  $x = 1$  and  $x = 4$ .
- (b) Describe both graphically and algebraically how you arrived at your answer.
- (c) Can you come up with a different method that gives you a better approximation? If so, describe the method used both graphically and algebraically.

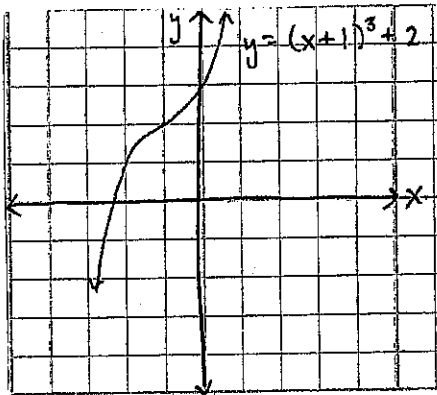
3. graph 3



- Approximate the area enclosed by the curves  $y = 0$ ,  $y = -x^2 + 4$ ,  $x = -2$  and  $x = 2$ .
- Describe both graphically and algebraically how you arrived at your answer.
- Describe how the methods you used in (1) and (2) apply to this problem.
- Can you come up with a different method that gives you a better approximation? If so, describe the method used both graphically and algebraically.

4. Using your results from (1), (2), and (3), both algebraically and graphically, describe a general method for finding the area between a part of a graph in the  $xy$ -plane and the  $x$ -axis. Try to come up with a method that will give you the best approximation possible. Explain why you think this will give a better approximation than other possible methods.

5. graph 4



- (a) Apply your method from (4) to approximate the area between the curves  $y = 0$ ,  $y = (x + 1)^3 + 2$ ,  $x = -2$  and  $x = 0$ .
- (b) Explain why you think this is a good approximation.