



Name \_\_\_\_\_

Hour \_\_\_\_\_ Date \_\_\_\_\_

## Halloween Activity

### Calculus

Work each problem. Then write the answers as an ordered pair (a, b) and follow the instructions for graphing on the sheet provided.

#### Right Eye

- What is the value at which there is a vertical asymptote of  $f(x) = \frac{x^2 + 5x + 6}{x^2 - 9}$ ?
  - At what value is there a removable discontinuity in  $f(x) = \frac{x^2 - 10x + 21}{x^2 + 2x - 15}$ ?
- $f(x) = 3x^3 - 5x^2 - 2x + 7$   
 $f(2) = ?$
  - Find  $\lim_{x \rightarrow \infty} \frac{5x + 1}{x + 2}$
- Evaluate:  $\sqrt[3]{128}$
  - Solve:  $\frac{x}{2} = 4$

Plot the points from #1, 2, 3, and connect the points.

#### Left Eye

- What is the instantaneous rate of change of  $y = 3x^2 + 10x$  when  $x = -2$ ?
  - Find  $\frac{d^2y}{dx^2}$  when  $x = 1$   
 $y = \frac{x^3}{3} + \frac{x^2}{2} + x$
- Find  $\frac{dy}{dx}$  when  $x = -2$   
 $y = x^2 + x + 1$
  - Find the average rate of change of  $y = x^3 + 1$  on the interval  $[-1, -2]$ .
- What is the leading coefficient of  $y = -7x^3 + 3x^2 - x + 4$ ?
  - Solve:  $\frac{3}{2}x = 6$

Plot the points from #4, 5, 6, and connect the points.

## Nose

7. a. What is the derivative of  $y^2 = x$   
where  $y = \frac{1}{2}$ ?
- b. Evaluate:  $4 \cos^2 \frac{\pi}{4}$
8. a. Find the slope of  $x^2 + y^2 = 25$   
at  $(3, -4)$  and multiply it by  $-\frac{8}{3}$ .
- b. Evaluate:  $\sin \frac{\pi}{2}$
9. a. What is the slope of a  
horizontal line?
- b. What is the slope of a line  
perpendicular to  $x - 2y = 7$ ?

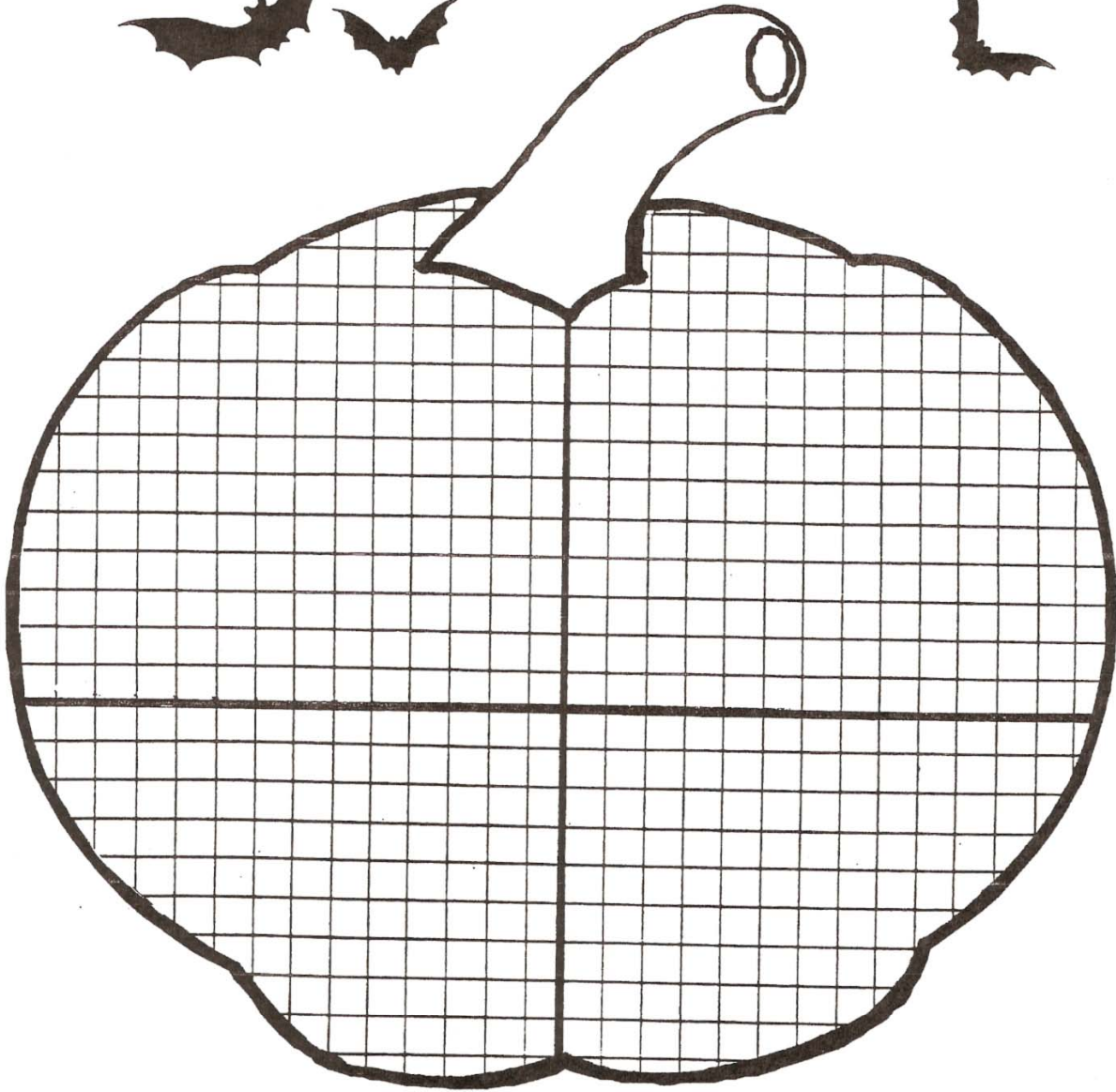
Plot the points from #7, 8, 9, and connect the points.

## Mouth

10. a. Find the derivative of  $x^2y + xy^2 = 6$   
at  $(1, 2)$ . Answer:  $y' = \frac{8}{?}$
- b. What is the opposite of the  
slope of  $x^2y^2 = 9$  at  $(-1, 3)$ ?
11. a. Find the derivative of  $y = (2x^2 - 1)^3$   
when  $x = 1$  and divide your answer  
by  $-4$ .
- b. Evaluate:  $-\sqrt[3]{216}$
12. a. Evaluate:  $\frac{\frac{3}{4} + \frac{1}{2}}{\frac{5}{8}}$
- b. Solve:  $-5 - 3x = 5x + 51$
13. a. Find the derivative of  $y = -x \sin x$   
when  $x = \pi$ ; round your answer to  
the nearest whole number.
- b. Find the derivative of  $y = e^{-2x}$ .  
What is the coefficient of your  
answer?

Plot the points from #10, 11, 12, 13, and connect the points in order.

Happy



Halloween!

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