New York City College of Technology MAT 1275 PLTL Workshops

Name: _____

Points: _____

Part I Using software to graph

- 1. Use Desmos to graph the line: y = xthe parabola: $y = x^2$ the circle: $x^2 + y^2 = 4$
- 2. Setting up an account so you can save your graph at any time. You will be using the graphs later in Part III.
- 3. Replace x with (x a) in each equation. Add a slider. What happens if a = 10? What happens if a = -10? More generally, describe what happens as a changes?
- 4. Replace y with (y b) in each equation. Guess what happens as b changes?
- 5. Add a slider. What happens if b = 10? What happens if b = -10? More generally, what happens as *b* changes? Is this what you thought would happen?
- 6. Does this agree with what you know about the graphs of y = x 5 and y = x + 3 (or, written differently, y 3 = x)? What about y = x + 5?

Part II

7. Predict what the graph of $(x + 2)^2 + 25 (y - 3)^2 = 25$ looks like. Draw a sketch here:

- 8. Check your answer using Desmos. If you didn't get the same answer, explain the difference.
- 9. What is the equation for the graph obtained from the graph in number 7 by shifting it down 2 units and to the right 1 unit.
- 10. Check your answer using Desmos.
- 11. The equation for a basic parabola with vertex (0,0), opening up is $y = x^2$ (see number 1). Write an equation of a parabola with vertex (2,-3) opening upward.
- 12. Write the equation of a circle Centered at (-3, 5) with radius 4.
- 13. You can check your answers using Desmos

PART III

- 14. Repeat number 1 in part I (or recall the saved graphs).
- 15. Consider replacing y by cy using a slider
- 16. Take $c = -4, -2, -1, -\frac{1}{2}, -\frac{1}{4}, \frac{1}{4}, \frac{1}{2}, 1, 2, 4$. What happened to the graph for each value of *c*?

- 17. Explain what happens as c changes, in general?
- 18. Do the same for x: (take replace x with (dx) and add a slider). Predict what happens to the graph for different values of d.
- 19. Take $d = -4, -2, -1, -\frac{1}{2}, -\frac{1}{4}, \frac{1}{4}, \frac{1}{2}, 1, 2, 4$ Did this match your predictions?
- 20. Check your answer with Desmos.

21. Write down the equation for the parabola that looks like the one in number 1 but opening downward instead (reflect about the x-axis). After you have done this, check your answer with Desmos.

22. Guess what the graph of $y = 2(x + 3)^2 - 4$ looks like. And what about $y = -2(x + 3)^2 - 4$?

23. Check your answers with Desmos.