

All members of the group must work together and turn in a paper of their own.

Part 1: Calculator inactive

1. Solve by factoring: $9x^3 - 36x = 0$


2. Factor: $f(x) = 12x^2 + 13x - 35$

3. Write a function in standard form with the roots of $x = \left\{-\frac{2}{3}, 5\right\}$

4. A quadratic function has a vertex at $(-3, 6)$ and goes through the point $(-1, 18)$. Write the function in vertex form.

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5. Find the number of roots, type of roots and zeros for $f(x) = 4x^2 + 12x + 9$.



6. Find the vertex by completing the square: $f(x) = 4x^2 - 25.6x + 30.96$



7. Using the quadratic function $f(x) = -3x^2 - 6x - 7$, answer the following:

- What is the vertex of the function?
- What is the axis of symmetry?
- Is the vertex a max or min?
- What is the domain? What is the range?
- Describe all the transformations from the graph of $f(x) = x^2$

8. Write the function of the parabola that is translated r units to the right and 6 units down

- In vertex form
- In standard form

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Part 2: Calculator active

9. A parabola is modeled by the function $f(x) = -2x^2 + 9x - 3$.

- a. What is the vertex of the function?
- b. What is the axis of symmetry?
- c. What are the approximate zeros (round to hundredths)?
- d. What is the domain? What is the range?

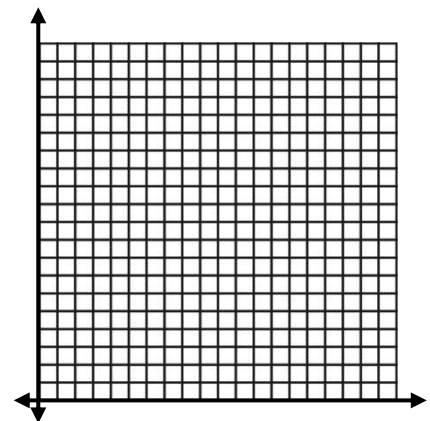
10. A projectile is launched upward from an initial height of h_0 feet at an initial velocity, v_0 , feet per second. A parabola that models this is of the form $h(t) = -16t^2 + v_0t + h_0$, where $h(t)$ is the height in feet after t seconds.

Readings for some heights and times are given in the following table:

t seconds	1	2	3
h(t) feet	171	303	403

Based on the information, find each of the following:

- a. What is the equation of the function that models the data?
- b. What is the initial velocity? What is the initial height?
- c. What is the height of the projectile at 2.5 seconds?
- d. At what times will the projectile be at 400 feet
- e. What is the time of the maximum height? What is the maximum height?
- f. What is a reasonable domain? What is a reasonable range?
- g. At what time does the projectile hit the ground?
- h. Sketch an accurate labeled and scaled graph of the problem



11. Solve using the quadratic formula for $-2x^2 + 11x = 3$

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12. Find the value of the discriminant for $f(x) = 9x^2 - 42x + 49$ and describe the roots of the function (do not solve the function)

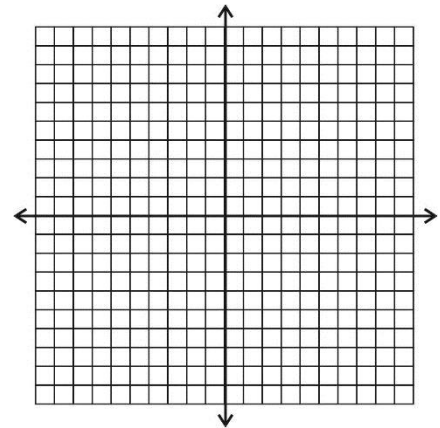
13. Solve by any method you choose $15x^2 = 7x + 2$

14. Solve the following system of equations algebraically. $y = x^2 + 10x - 3$ and $y = 2x - 18$

15. Graph and shade the solution region of the following system

$$y \geq x^2 + 2x - 8$$

$$y < -x^2 + 5x + 1$$



16. Solve the following system graphically. Sketch the graph and include the points of intersection.

$$y = 2x^2 + 4x$$

$$y = -\frac{1}{2}x + 5$$

