Algebra 2
1st Semester Final Review

Name_____

1. Multiply $-6i(4-5i)$

2. Simplify $(5-2i)(6+8i)$

3. Simplify $(9+4i)-(3+2i)$

4. Solve $\frac{x+4}{\sqrt{x}}=\sqrt{14}$

5. As a fund raiser, the Key Club is collecting used cell phones to recycle. The equation $y=5x+50$ represents the clubs earnings, *y*, based on collecting *x* cell phones. How much money does the Key Club earn if 75 cell phones are collected?

6. Find the equation of a circle with diameter endpoints $(7,-5)$ and $(-1,10)$

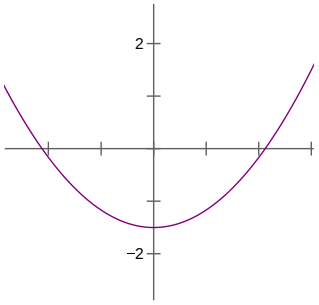
7. Is point $(-15,4)$ on the circle with the equation $(x-2)^2+(y-4)^2=289$?

8. A model for a company's revenue is $R=-15p^2+300p+12,000$, where *p* is the price in dollars of the company's product. What price will maximize the revenue? Find the maximum revenue.

9. Write $f(x)=3x^2+6x+52$ in vertex form.

10. Find the vertex, domain, and range of the function $f(x)=\sqrt{x-2}-3$.

11. What is the domain of the quadratic function shown on the graph?



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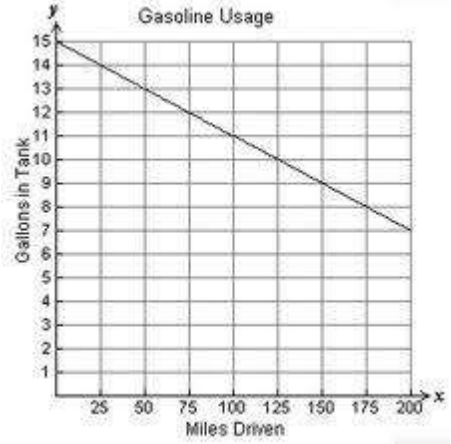
12. April is going on a trip and starting it off with a full tank of 15 gallons of gasoline. The graph on the coordinate grid shows a linear function shows the gas she expects to use while driving on her trip.



Write the equation in slope-intercept form of the function. Find the x-intercept, what does it represent?

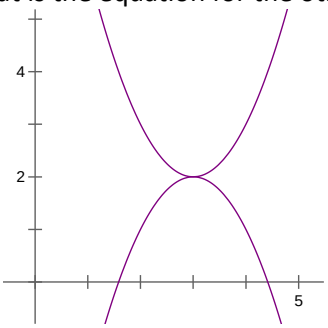
13. A golf ball is hit by a professional golfer. The height of the ball (in feet) is tracked as time passes (in seconds), and recorded on a data table.

Golf Ball Height					
Time (s)	0	0.5	1	2	3
Height (ft)	0	20	37	58	58

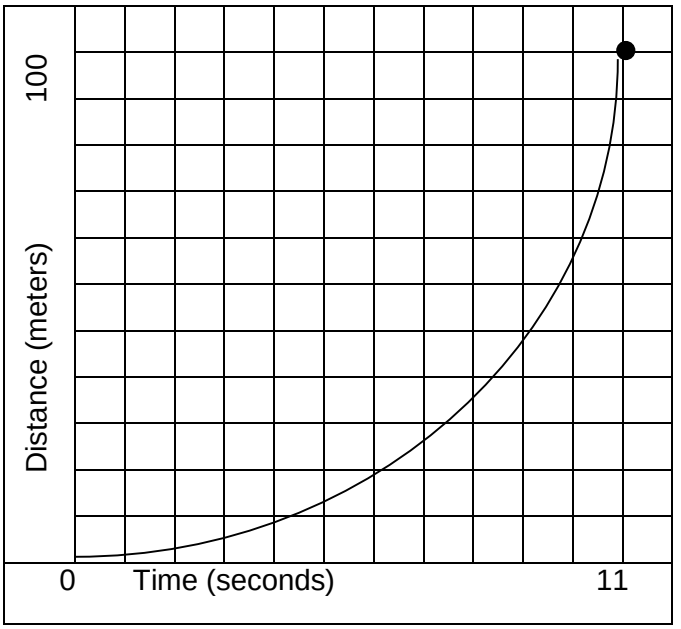
In which time interval does the soccer ball reach its maximum height?

14. One parabola shown has equation $y=(x-3)^2+2$.

What is the equation for the other?



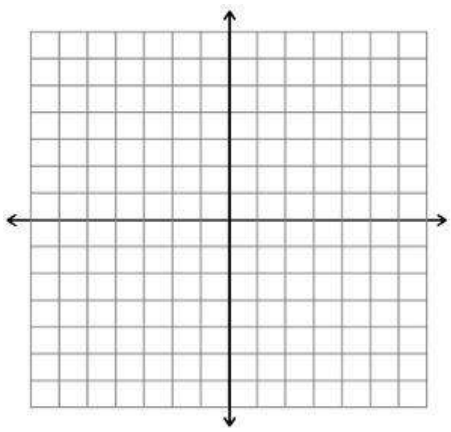
15. The graph represents a function related to a runner's movement over the course of a 100 meter race.



Which function could this graph represent?

a. The speed of the runner as he decreases his speed of acceleration
b. The distance of the runner from the starting line as he accelerates
c. The distance of the runner from the starting line as he approaches at a constant speed
d. The speed of the runner as he slows down when approaching the finish line.

16. Graph $y=2(x-1)^2-3$



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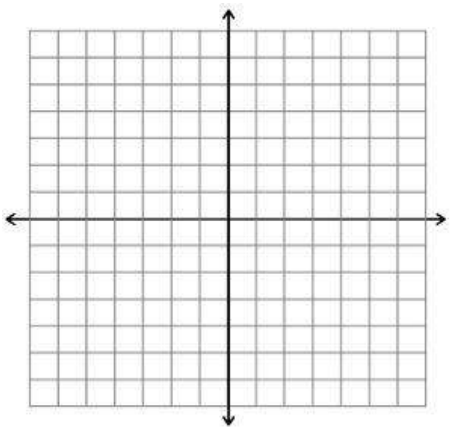
17. Graph $2x+3y=7$



18. Solve $y=mx+b$ for *x*?

19. Solve

a. $0.5(-8p+1)=-4p+1$

b. $4x-2(3+2x)=-6$

20. In slope-intercept form, write the equation of the line that contains the points in the table.

x	-8	-4	4	8
y	-5	-3.5	-0.5	1

21. Mr. Robinson would like to put a pool in his backyard. He wants the width to be 1 ft more than the length. He also wants the pool to have a surface area of 210 ft^2. Write and solve an equation to find the dimensions of the pool.

22. Magnets cost $10 plus $1.25 each to produce. You sell them for $1.75. How many magnets were sold if you made a profit of $60?

23. Express the catering cost as a function of the number of people. Find how many people were in the group if the catering cost was $338.

# in Group	Cost
4	98
7	134
15	230

24. The path of a projectile thrown in the air is modeled by $h(t)=-16t^2+22t+3$, where *h* is the height in feet and *t* is time in seconds. Use factoring to find the time(s) at which the projectile is at ground level.

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25. List all possible rational zeros of each function.

a. $g(x) = 6x^3 + 6x^2 - 15x - 2$

b. $h(x) = 9x^6 - 5x^3 + 27$

26. Write the simplest polynomial function that has the given roots.

a. 3, $\sqrt{5}$

b. $4i$, 3, -3

27. Divide $(x^4 - 2x^3 + x - 1) \div (x + 1)$

28. Divide $(2x^3 - 5x^2 + 22x + 51) \div (2x + 3)$

29. Divide $\frac{x^2 - 4}{x + 3} \div \frac{x^2 - 4x + 4}{x^2 + 3x}$

30. Multiply $\frac{x - 3}{x^2 - 25} \cdot \frac{x^2 + 4x - 5}{x^2 - 4x + 3}$

31. Simplify $\frac{x - 1}{x^2 + 3x + 2} + \frac{x}{x + 1}$

32. Simplify $\frac{x + 2}{x^2 + 4x + 3} - \frac{x - 1}{x + 3}$

33. Find the value of *k* for which $(x - 2)$ is a factor of $x^3 + 3x^2 - x + k = 0$

34. Expand the binomial $(r - 3)^4$

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$$f(x) = x^3 - 2x^2 - 4x + 8$$

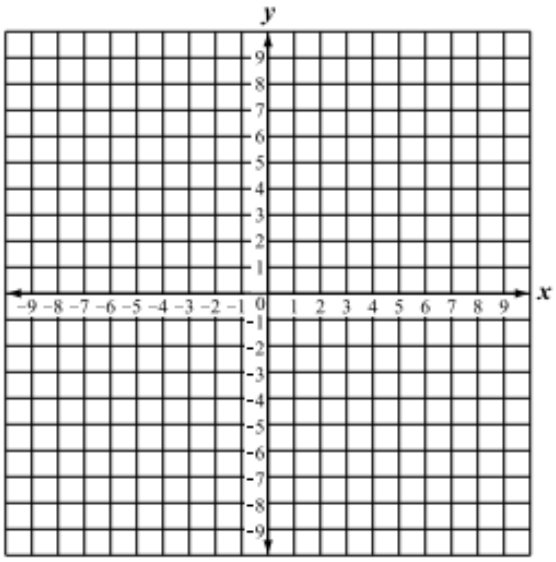
a. What are the zeros of the function?

b. Rewrite the polynomial in factored form.

c. What are the left and right behaviors of the function?

d. Find the y-intercept of the function.

e. Using your knowledge of left and right behaviors of a function, and the rules of multiplicity of zeros, sketch the graph of the polynomial function below. Plot all x and y intercepts.



35. Solve the quadratic $x^2 - 8x + 11 = 0$

36. Solve $\frac{3}{x^2 + 3x} + \frac{x+2}{x+3} = \frac{1}{x}$

37. Find the value of *x* that makes each sentence true.

a. $(5^{\frac{1}{3}})^x = 25$

b. $\frac{36^2}{36^x} = 6$

38. Find all zeros and graph the polynomial.