Name _____ **Period** _____ **Date** _____

Algebra 2 – 1st Semester Review

Quadratic Functions:

1. What is the vertex of $f(x)=(x+3)^2-2$ and which way does it open?

2. Given the function $f(x)=-3x^2+12x-8$

Part A: State the vertex

Part B: Graph *f(x)*. Be sure to find enough points to draw an adequate graph. Label the axes and scales used to construct the graph.

Solve using any method:

3. $6x^2-2=142$

4. $(k-1)^2+7=-43$

5. $25v^2-30v=-9$

6. $9x^2+11x=-5$

7. $3x^2-4x=x^2+30$

8. While playing a game of baseball, a ball is thrown. The height of the ball can be modeled by the function $h(t)=-16t^2+24t+5$, where *h(t)* is the height of the ball, in feet, above the ground and *t* is the time in seconds after the ball was thrown.

Part A: How long was the ball in the air when it reached its maximum height?

Part B: What was the maximum height of the ball?

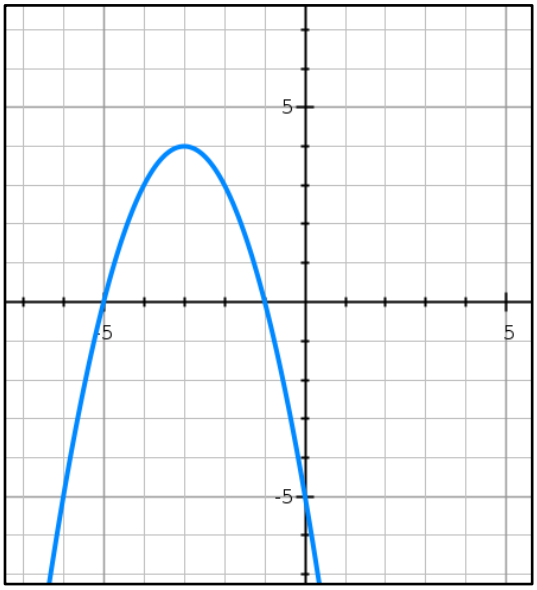
Part C: What was the initial height of the ball?

Part D: If the ball is caught at a height of 3 feet above the ground, how long was it in the air? Show or explain your work. Round to 3 decimal places.

Part E: If the ball is not caught, how long would it take for it to hit the ground? Show or explain your work. Round to 3 decimal places.

9. A rock is thrown from the top of a tall building. The distance, in feet, between the rock and the ground *t* seconds after it is thrown is given by $d=-16t^2-2t+325$. How long after the ball is thrown is it 320 feet from the ground?

10. The equation $f(x)=-(x-4)^2+5$ represents ***f(x)*** and the graph below represents ***g(x)***.



Select whether each statement is **true** or **false** about the given functions.

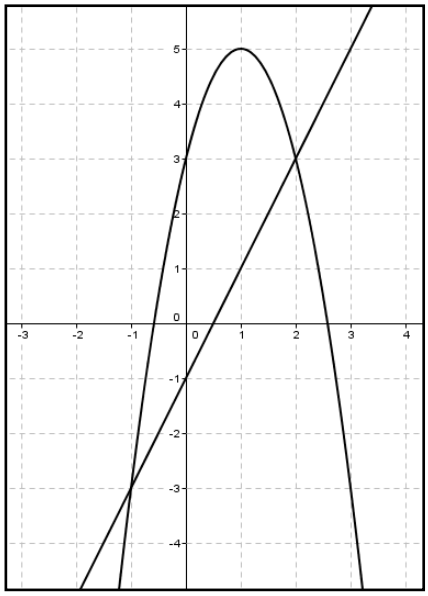
Statement	True	False
A) The line of symmetry of $g(x)$ is $x = -5$		
B) The maximum of $g(x)$ is less than the maximum of $f(x)$.		
C) The value of x when $f(x)$ is at the maximum is less than the value of x when $g(x)$ is at the maximum.		
D) The y-intercept of $g(x)$ is greater than the y-intercept of $f(x)$.		

11. Identify the solution for $2x^2-x-3>0$ and state your answer in any of the three standard forms. (Hint: Graph it first.)

12. If $f(x) = -2x^2 + 4x + 3$ and $g(x) = 2x - 1$ are the graphs given below, state the solutions for

A) $f(x) = g(x)$

B) $f(x) \leq g(x)$



Polynomial Functions:

13. Add $\left(3b^5 - 4b^3 - 2\right) + \left(7b^5 - b + 5\right)$

14. Subtract $\left(-7x^3 - 4x\right) - \left(-3x + 5 - 2x^3\right)$

15. Factor completely: $2x^5 + 6x^4 - 8x^3$

In 16-18, divide:

16. $\left(n^3 + 125\right) \div \left(n + 5\right)$

17. $\left(6x^3 - 44x^2 + 16x - 11\right) \div \left(x - 7\right)$

18. $\left(3x^3 - 14x^2 + 16x - 3\right) \div \left(x - 3\right)$

In 19-21, find all the zeros and the y-intercept, then graph the function on graph paper.

19. $f(x) = -(x-3)(x-2)(x+1)(x+5)$

20. $g(x) = 3(x+4)^2(x-1)^3$

21. $h(x) = -4x(x+7)(x-2)(x+3)^2$

In 22-25, given the information, rewrite the function in factored form, find all the zeros and the y-intercept, then graph the function on graph paper.

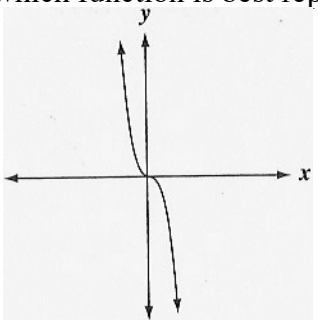
22. $f(x) = x^3 - 5x^2 + 8x - 4$; one factor is $\left(x - 2\right)$.

23. $g(x) = 2x^3 - 4x + 2$; $x = 1$ is a zero.

24. $h(x) = 2x^3 + x^2 - 6x - 3$; one factor is $\left(2x + 1\right)$

25. $h(x) = x^4 - x^3 - 12x^2 - 4x + 16$; two factors are $\left(x + 2\right)$ & $\left(x - 1\right)$.

26. Based on what you know about end behavior, which function is best represented by this graph:



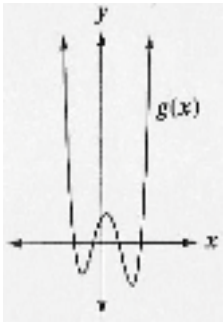
A. $f(x) = -8x^6$

B. $f(x) = -8x^3$

C. $f(x) = 8x^6$

D. $f(x) = 8x^3$

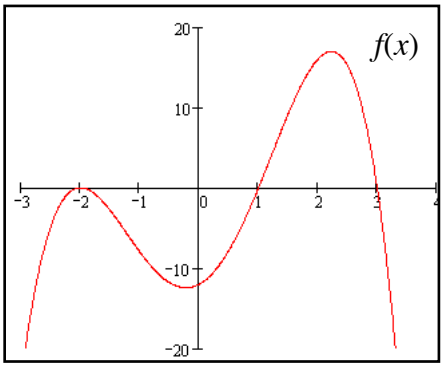
27. The function g(x) is graphed below. Which could be the degree of g(x)?



A. first B. second C. third D. fourth

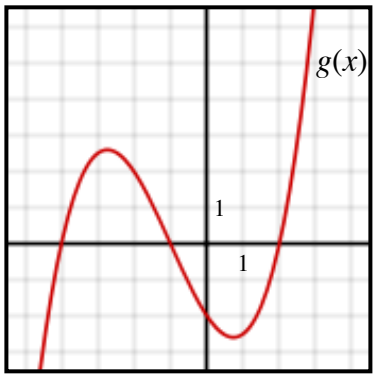
Write a possible symbolic representation for the graph shown below:

28.

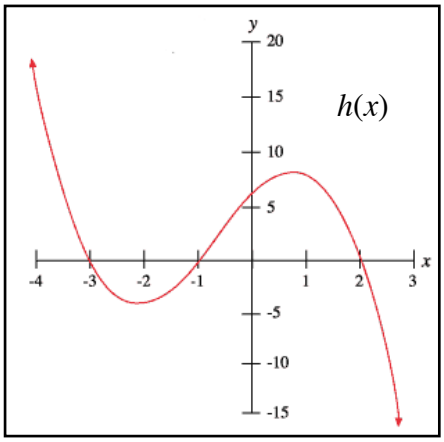


Write a possible symbolic representation for each of the graphs shown below:

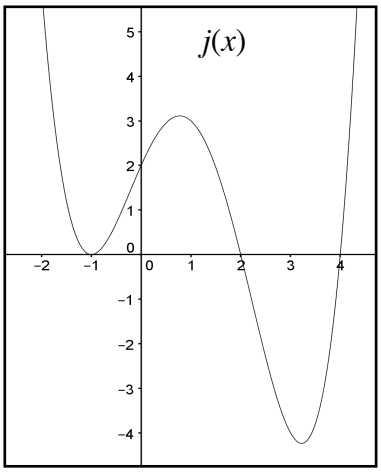
29.



30.



31.



In 32 & 33, determine the solution and represent your solution in any of the three standard notations (complete sentence, set, or interval).

32. $-(x-3)(x-2)(x+1)(x+5)<0$

33. $(x-4)(x+6)(x-1)\geq 0$

34. The graph below shows the cubic functions $f(x)$ and $g(x)$.

a) State the solution for $f(x)=g(x)$

b) State the solution for $f(x)\geq g(x)$

c) State the solution for $f(x)<g(x)$