Name: _____ Period: _____ Date: _____

Regressions + A.APR.A.2

1. ***Cubic Regression

A publisher reported these sales of a book series on hobbies.

Years since 1985	1	3	6	8	9
Books sold (thousands)	4.3	6.1	10.7	12.1	13.5

Use the cubic regression feature of a graphing calculator to find the cubic equation that best fits this data.

Then, use the regression equation to determine how many books we sold in 1998.

2.

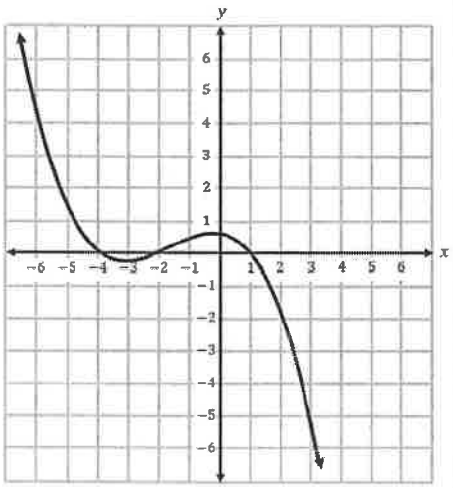
A box containing 1,000 coins is shaken, and the coins are emptied onto a table. Only the coins that land heads up are returned to the box, and then the process is repeated. The accompanying table shows the number of trials and the number of coins returned to the box after each trial.

Trial	0	1	3	4	6
Coins Returned	1,000	610	220	132	45

Write an exponential regression equation, rounding the calculated values to the *nearest ten-thousandth*. Use the equation to predict how many coins would be returned to the box after the eighth trial.

3.

Consider the graph of the polynomial function.



What zeros are used to construct the graph of the function?

A $x = -4$, $x = -2$, and $x = 1$

B $x = -4$ and $x = -2$ only

C $x = -1$, $x = 2$, and $x = 4$

D $x = 2$ and $x = 4$ only

4.

A polynomial function has zeros of $x = -4$, 3, and 8. Which *could* be the function?

A $f(x) = (x + 4)(x + 3)(x - 8)$

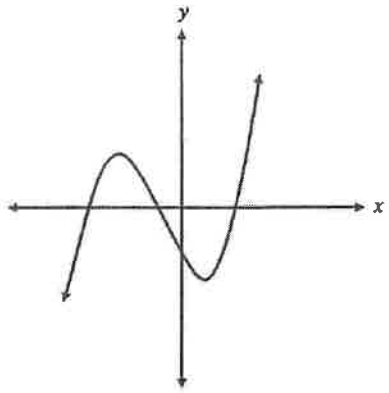
B $f(x) = (x + 4)(x - 3)(x - 8)$

C $f(x) = (x - 4)(x + 3)(x + 8)$

D $f(x) = (x - 4)(x - 3)(x + 8)$

5.

Consider the graph of a polynomial function, $f(x)$, with x-intercepts at $(-8, 0)$, $(-3, 0)$, and $(6, 0)$ and a y-intercept at $(0, -4)$.



If the lead coefficient of $f(x)$ is greater than 0, which statement is true?

A The polynomial has a degree of 3 and a factorization of $(x-8)(x-3)(x+6)$.

B The polynomial has a degree of 3 and a factorization of $(x-6)(x+3)(x+8)$.

C The polynomial has a degree of 4 and a factorization of $(x-8)(x-4)(x-3)(x+6)$.

D The polynomial has a degree of 4 and a factorization of $(x-6)(x+3)(x+4)(x+8)$.

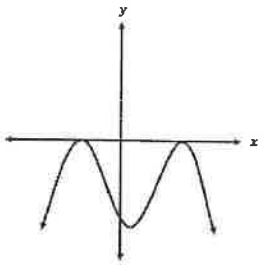
6.

Consider a polynomial function, $f(x)$, with the given properties.

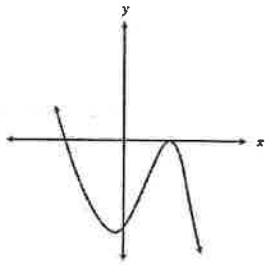
- $f(x)$ has a zero with multiplicity 2 at $x = -5$.
- $f(x)$ has a zero with multiplicity 2 at $x = 6$.
- $f(x)$ has a y-intercept at $(0, -7)$.
- $f(x)$ has a negative leading coefficient.

Which graph *could* represent $f(x)$?

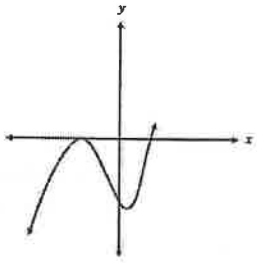
A



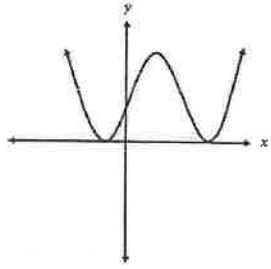
C



B



D

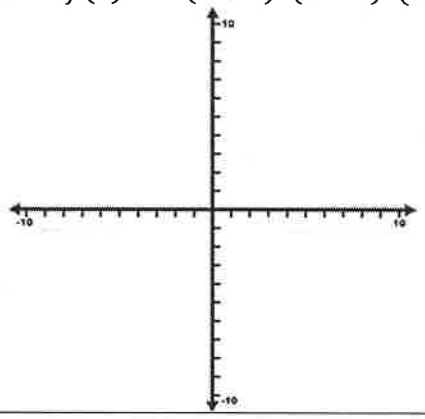


7.

Which polynomial function has zeros at –3, 0, and 4?

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

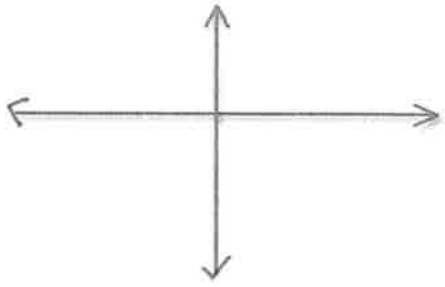
8. Sketch: $f(x) = -(x+6)^3(x-1)^2(x-4)$



9. and 10.

Function	*n* degree	*a* Lead coef.	End Behavior ~~(use *n* and *a*)~~	*x*-intercepts
9. $f(x) = (x-1)^3(x+4)^2$			As $x \to$ ___, $f(x) \to$ ___ As $x \to$ ___, $f(x) \to$ ___	
10. $f(x) = x(x+3)(x+1)(x-1)(x-3)$				

9)



10)