1. The equation $h = 241m^{-\frac{1}{4}}$ predicts a mammal's heart rate, h, in beats per minute, based on it's mass, m, in kilograms. What is the predicted heart rate, in beats per minute, of a polar bear with a mass of 326 kilograms?

A 57

B 67

C 82

D 92

EOC Algebra II Sample Items Goal 1

If $f(x) = x^2 - x$ and $g(x) = x - 1$, what is $f(g(x))$?

A $x^2 - x - 1$

B $x^2 - x - 2$

C $x^2 - 3x + 2$

D $x^2 - 3x + 1$

EOC Algebra II Sample Items Goal 1

The distance required for a car to stop is directly proportional to the square of its velocity. If a car can stop in 112.5 meters at 15 kilometers per hour, how many meters are needed to stop at 25 kilometers per hour?

A 250.75

B 298.00

C 312.50

D 337.50

4. The equation $c = 523{,}430(1.193)^x$ models the pounds of U.S. copper produced from 1987 to 1992. Which statement ***best*** interprets the coefficient and base of this equation?

A The copper production in 1987 was 523,430 pounds, and it increased at a rate of 1.93% per year during that period.

B The copper production in 1987 was 523,430 pounds, and it increased at a rate of 19.3% per year during that period.

C The copper production increased by a factor of $523{,}430 \times 1.193$ pounds per year during that period.

D The copper production at the beginning of 1987 was at 1.193 pounds, and it increased by a factor of 523,430 pounds per year during that period.

5. Alan deposited $300 in an account that pays 6% interest compounded continuously. ***Approximately*** how long will it take for Alan's money to triple? (Use the formula $A = Pe^{rt}$ where A is the accumulated amount, P is the initial amount, r is the annual rate of interest, and t is the elapsed time in years.)

A 7.95 years

B 11.55 years

C 18.31 years

D 23.10 years

6. The table shows the growth of a certain bacteria.

Time in Hours, x	0	1	2	3	4	5
Number of Cells, N	50	71	100	141	200	283

If N represents the number of cells at time x, which equation ***best*** models this set of data?

A $N = 45.51x + 27.05$

B $N = 27.05x + 45.51$

C $N = (1.41)(50.06)^x$

D $N = (50.06)(1.41)^x$

7. The chart below shows the weight of fish (in thousands of pounds) caught in area lakes for six consecutive years.

Elapsed Time, t (in years)	**Weight** (in thousands of pounds)
0	13.7
1	14.6
2	15.5
3	15.1
4	14.2
5	12.4

Based on the best-fit quadratic model, at which value of t will the amount of fish caught be ***approximately*** 6,700 pounds?

A 6

B 7

C 8

D 9

8. Which is an equation for the parabola that has vertex $(-2, 3)$ and passes through the point $(-1, 5)$?

A $y = x^2 + 4x + 7$

B $y = x^2 - 4x + 7$

C $y = 2x^2 - 8x + 11$

D $y = 2x^2 + 8x + 11$

11. Mr. Greene has 8.5 in. by 11 in. cardboard sheets. As a class project, Mr. Greene asked each of his students to make an open-top box under these conditions:

I) Each box must be made by cutting small squares from each corner of a cardboard sheet.

II) The box must have a volume of 48 in^3.

III) The amount of cardboard waste must be minimized.

What is the ***approximate*** side length for the small squares that would be cut from the cardboard sheet?

A 3.65 in.

B 2.66 in.

C 0.71 in.

D 0.57 in.

The height, $h(t)$, in feet, of an object shot from a cannon with initial velocity of 20 feet per second can be modeled by the equation $h(t) = -16t^2 + 20t + 6$, where t is the time, in seconds, after the cannon is fired. What is the maximum altitude that the object reaches?

A 13.5 feet

B 12.25 feet

C 10.25 feet

D 1.5 feet

The Gardners wish to double the area of their 6-by-4-foot garden by adding an equal amount to each dimension. How much should be added to each dimension?

A $\frac{1}{2}$ foot

B 1 foot

C 2 feet

D 4 feet

12. Solve: $3x^2 + 7x = 2$

A $\left\{\frac{-7+\sqrt{73}}{6}, \frac{-7-\sqrt{73}}{6}\right\}$

B $\left\{\frac{-7+\sqrt{73}}{2}, \frac{-7-\sqrt{73}}{2}\right\}$

C $\left\{-2, -\frac{1}{3}\right\}$

D $\left\{\frac{1}{3}, 2\right\}$

13. A ball is thrown upward. Its height (h, in feet) is given by the function $h = -16t^2 + 64t + 3$, where t is the length of time (in seconds) that the ball has been in the air. What is the ***maximum*** height that the ball reaches?

A 3 ft

B 51 ft

C 63 ft

D 67 ft

14. The table shows the number of households with a telephone answering machine in selected years after 1980.

Years after 1980 (x)	4	6	8	10	12	14	16	18
Number of Households with Answering Machines	8.7	10.8	13.0	16.0	21.0	30.0	37.5	43.8

Using the data points, which quadratic equation ***best*** models this set of data?

A $y = 8.4x^2 - 0.6x + 7.3$

B $y = 0.15x^2 - 0.74x + 9.25$

C $y = 0.2x^2 - 1.5x + 12$

D $y = -0.008x^2 + 0.79x - 1.39$

15. A company's total revenue R (in millions of dollars) is related to its expenses by the equation $R = 4x^3 - 16x^2 + 12x$, where x is the amount of expenses (in tens of thousands of dollars). What values of x will produce zero revenue?

A $x = 0, x = 1, x = 3$

B $x = 1, x = 3, x = 4$

C $x = 1, x = 3$

D $x = 0, x = -1, x = -3$

16. Which function models the population of Ethiopia from 1940 to 20((let $x = 0$ in 1940)?

Year	**Population of Ethiopia** (in millions)
1940	16
1950	20
1960	25
1970	31
1980	39
1990	50
2000	64

A $f(x) = 0.01x^2 + 0.179x + 16.6$

B $f(x) = 0.01x^2 + 0.181x + 15.9$

C $f(x) = 15.82(1.023)^x$

D $f(x) = 16(1.02)^x$