

Algebra 1 Honors
EOC Review #2
Calculator Portion

1. Ms. Robinson wrote the six numbers listed below.

$$\sqrt{18} \quad 3\sqrt{2} \quad 7\sqrt{6} \quad 4\sqrt{7} \quad 5\sqrt{8} \quad 2\sqrt{24}$$

She asked the students in her math class to identify two irrational numbers from the list whose product results in a rational number. Which combination of numbers is correct?

[A] $3\sqrt{2}$ and $7\sqrt{6}$ [B] $3\sqrt{2}$ and $5\sqrt{8}$ [C] $7\sqrt{6}$ and $4\sqrt{7}$

[D] $7\sqrt{6}$ and $2\sqrt{24}$ [E] $\sqrt{18}$ and $5\sqrt{8}$ [F] $4\sqrt{7}$ and $4\sqrt{7}$

2. Cheryl claims that any irrational number squared will result in a rational number. Given the numbers below select any number that makes this claim true. Select all that apply.

[A] $\frac{\sqrt[3]{2}}{\sqrt{5}}$ [B] $\frac{\sqrt{7}}{\sqrt{3}}$ [C] $\sqrt[3]{2}$

[D] $\sqrt{11}$ [E] π [F] $\sqrt{\pi}$

3. Which of the following equations are true? Select three that apply.

[A] $\sqrt{64} = 2^{\frac{6}{2}}$ [B] $4^{\frac{3}{2}} = 2^3$ [C] $216^{\frac{4}{3}} = 36^2$

[D] $8^{\frac{1}{2}} = \sqrt{16}$ [E] $(\sqrt{36})^{\frac{1}{2}} = 18^{\frac{1}{4}}$

For problem 4, **evaluate** or **simplify** the expression.

4. $2x\sqrt{6x^{-1}y^{-3}z^6} \cdot -7yz\sqrt{3xy^6z^{-1}}$

For problem 5, rewrite the expression with **POSITIVE** rational exponents.

5. $\sqrt[4]{5^{-6}} \cdot \sqrt[3]{x} \cdot \sqrt{y^{-7}} \cdot \sqrt[6]{z^{-10}}$

For problem 6, simplify the expression and rewrite any rational exponents in their radical form with positive exponents and indexes.

6. $(3^{-1}x^8y^{10}z^{-12})^{-\frac{5}{6}}$

7. Rewrite the expression $8^{-\frac{5}{4}} \cdot 2^{\frac{19}{6}}$ as a single radical expression in the form $\sqrt[n]{b^m}$.
where **b**, **m** and **n** are positive integers.

8. Given : $ax^2 + bx + c = 2(1.2x + 0.3)(x - 0.5) - (0.5x^2 + 2.5x - 1.3)$. What are the values of **a**, **b** and **c**.

9. What is $(5x + 4y)^2 - (3x - 2y)^2$?

For problem 10, **factor** the expression completely.

10. $45x^3 - 20xy^2$

11. Given the expression $24x^4 + 60x^3y - 42x^2y^2 - 105xy^3$, which of the following expressions is a factor. Select all that apply.

[A] $5x + 2y$ [B] $4x^2 - 7y^2$ [C] $2x + 5y$ [D] $2x + 5y$ [E] $4x^2 + 7y^2$

12. The area of a rectangular window $105x^3 - 5x^2 - 10x$. Both the length and the width are polynomials with integer coefficients. Which of the following could represent the length of the window? Select all that apply.

- [A] $35x + 10$ [B] $3x - 1$ [C] $7x - 2$ [D] $7x + 2$ [E] $3x + 1$

For problems 13 – 15, solve the equation for the specified variable.

13. $px + 7 - 5x + 7w = 4w - 2x + 8$, for x .

14. $6V^3\pi^2r^6 = \frac{3}{2}V^4\pi^5r^2h$, for h .

15. The principle of conservation of momentum states that $m_1u_1 + m_2u_2 = m_1v_1 + m_2v_2$, where m_1 and m_2 are the masses of two objects colliding, u_1 and u_2 are the initial velocities of the objects, and v_1 , and, v_2 are the final velocities of the objects.

Rewrite the formula in terms of m_1 ?

16. The formula that describes an object's motion is given by $S = ut + \frac{1}{2}at^2$ where S is the distance traveled, u is the initial velocity, a is the acceleration, and t is the time. Which equation represents a in terms of the other variables?

For problems 17 – 19, **solve** each inequality and **graph** the solution on a number line.

17. $\frac{3}{2}(6 - 18x) > 90$

18. $-x - 4(x - 2) + 7 \geq 1 - 2(x + 1) + 5x$

19. $-17 < 3x - 5(x - 1) \leq 21$

20. The function f and g are defined by $f(x) = x^2$ and $g(x) = 2x$, respectively.

Evaluate the function $h(x) = \frac{f(-2x) \cdot g(-2x^2)}{2}$.

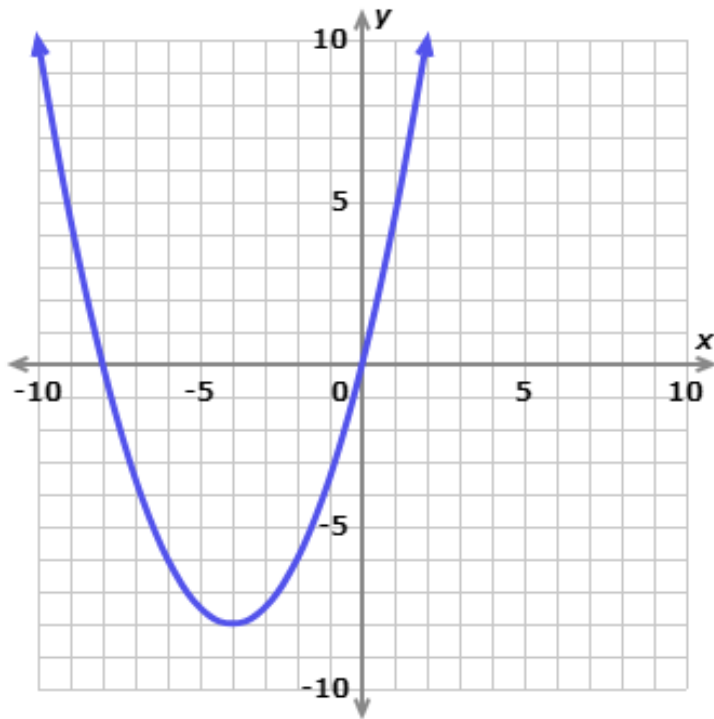
21. Given : $f(x) = -5x^2 + 6x - 3$ & $g(x) = 7x^2 - 4x$

a) Find $(f + g)(x)$.

b) Find $(g - f)(x)$.

c) Find $(g \cdot f)(x)$.

22. Given the graph answer part $a - e$.



a) What is the x -intercept(s)?

b) What is the y -intercept?

c) What is the vertex?

d) What is the equation of the axis of symmetry?

e) What is the minimum value of this function?

23. Given the equation : $y = -x^2 - 10x + 7$, answer parts **a** – **d**.

a) What is the vertex?

b) What is the y-intercept?

c) What is the equation of the axis of symmetry?

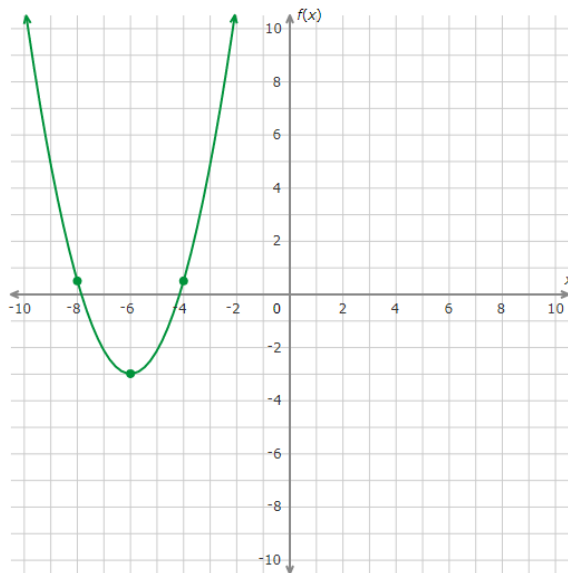
d) What is the maximum value of the equation?

24. Match each quadratic functions to its graph.

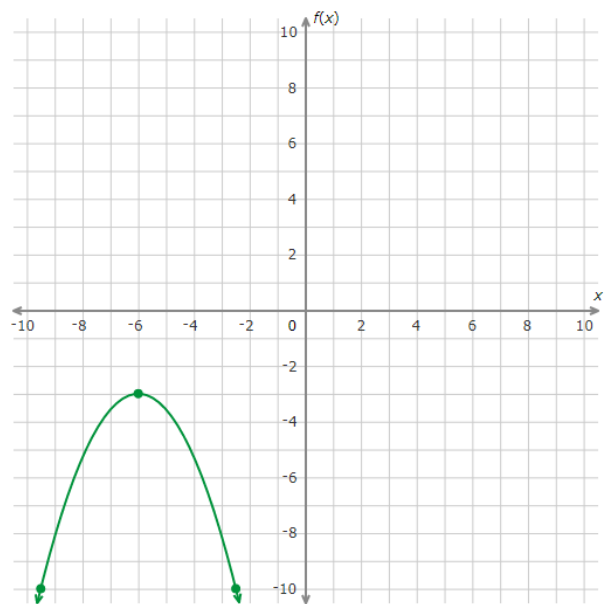
$$f(x) = -x^2 - 12x - 36 \quad g(x) = -2x^2 - 24x - 67 \quad h(x) = 3x^2 + 36x + 108$$

$$j(x) = x^2 + 12x + 41 \quad k(x) = -2x^2 - 24x - 75 \quad m(x) = x^2 + 12x + 33$$

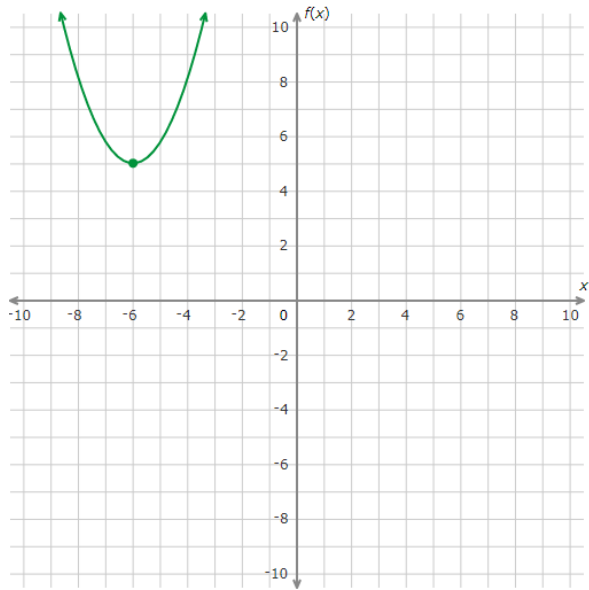
[A]



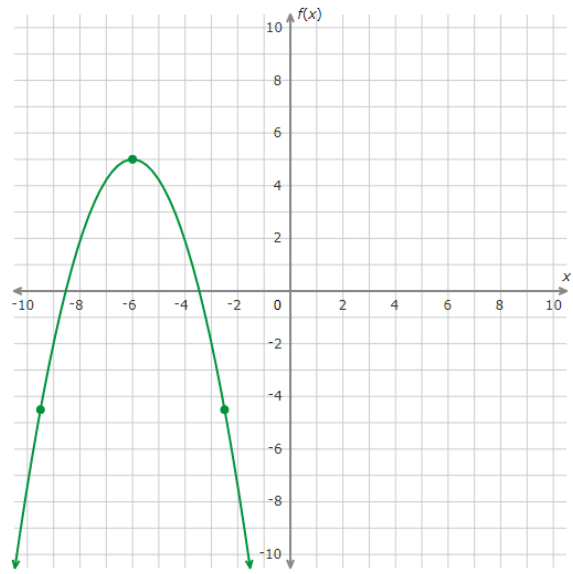
[B]



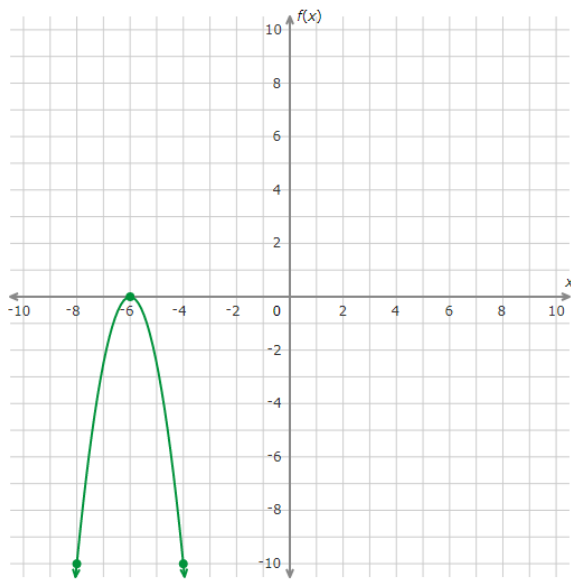
[C]



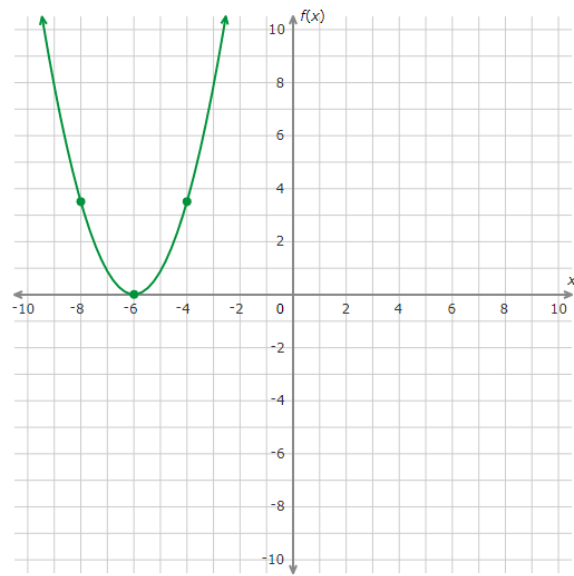
[D]



[E]



[F]



For problem 25, compute the **discriminant**, then determine the **number** and **type** of solutions for the given equation .

$$25. 6x^2 - 7x - 5 = -9x + x^2 - 8$$

For problem 26, solve the quadratic equation using the **square root method**.

$$26. -2(-4x - 1)^2 + 37 = -61$$

For problem 27, solve the quadratic equation by **factoring**.

$$27. 51x^2 + 13x - 7 = -39x + 11x^2 + 5$$

For problems 28 – 29, solve the quadratic equation using the **quadratic formula**.

$$28. 4x^2 + 6x - 2 = -x^2 + 17x - 9$$

$$29. 6x^2 - 7x + 3 = 2x(x + 3)$$

30. Thomas solved the quadratic equation shown : $4x^2 - 24x + 7 = 3$.

One of the steps that Matthew used to solve the equation is shown. Fill in the blanks to show how Thomas solved the equation. (**Hint : Solve by completing the square.**)

$$\text{Step : } 4(x - \square)^2 = \square$$

$$\text{Solution : } x = \square \pm \square\sqrt{\square}$$

31. An object is launched from the top of a building. The function that models the height, $f(t)$, in feet, of the object after t seconds is given by $f(t) = -16t^2 + 96t + 180$. Which statement is true?

- [A] The object will land on the ground after 4.5 seconds.
- [B] The object will obtain a maximum height of 180 feet.
- [C] The object will obtain a maximum height after 6 seconds.
- [D] The object is launched from 180 feet above the ground.
- [E] The object will obtain a maximum height after 7.5 seconds.

32. The height, in feet, of an arrow shot from a bow in an upwards direction, is modeled by the function $f(t) = -16t^2 + 96t + 5$, where t represents the time in seconds. During which interval is the arrow going up?

33. Herman goes to a roof of a twelve-story building and looks over the edge to the pool 160 feet below. Herman throws his book straight down at 48 feet per second, the time t the book is in the air is given by the function $s(t) = -16t^2 - 44t + 160$. How many seconds is the book in the air before it lands in the pool?

34. Bruce's Bakery recently spent a total of \$240 on new equipment, and their average hourly operating costs are \$11. Their average hourly receipts are \$51. The bakery will soon make back the amount it invested in equipment. What would the total expenses and receipts both equal? How many hours will that take?

The bakery's expenses and receipts will both total \$_____ after _____ hours.

For problems 35 – 37, solve the system of equations.

35.
$$\begin{cases} -2x + 5y = 20 \\ 3x - 7y = -26 \end{cases}$$

36.
$$\begin{cases} 15x - 10y = -20 \\ 9x - 6y = 18 \end{cases}$$

37.
$$\begin{cases} y = 2x^2 - 6x - 3 \\ y = -6x + 47 \end{cases}$$

38. Given : $g(x) = -3.8(4.5)^x - 9.37$, find $g(2)$. (**Round your result to the nearest hundredth**).

39. Condos in Millersburg go up in value by 3% each year. If the Bowman family's condo is now worth \$318,145, what will it be worth in 9 years? If necessary, round your answer to the nearest cent.

40. How much of a radioactive kind of bismuth will be left after 80 minutes if the half-life is 20 minutes and you start with 23,840 grams?

41. A homeowner looked at her electric bill over the past six months and noticed that the bill has been increasing as is shown below.

Month	Amount
August	\$64.20
September	\$67.41
October	\$70.79
November	\$74.30
December	\$78.02
January	\$81.94

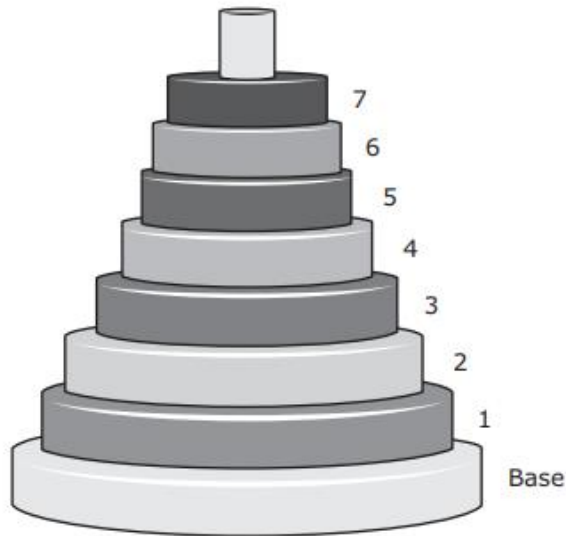
Which type of function best models the homeowner's electric bill over the past six months?

- [A] linear [B] exponential [C] cubic [D] quadratic

42. The expression for the amount of money earned on a savings account compounded quarterly is given by the expression $x(1.1)^{4t}$ where x represents the principal and t is the time in years since the principal was invested. Which expression is the equivalent form of the given expression. Select all that apply.

- [A] $x(1.4641)^{4t}$ [B] $x(1.4641)^{2t}$ [C] $x(4.4)^t$
[D] $x(1.21)^{4t}$ [E] $x(1.21)^{2t}$

43. A toy is made up of cylindrical rings stacked on a base, as shown in the diagram. The diameter of Ring 1 is 87% of the diameter of the base. For Ring 2 through Ring 7, the diameter of each ring is 87% of the diameter of the ring directly below it.

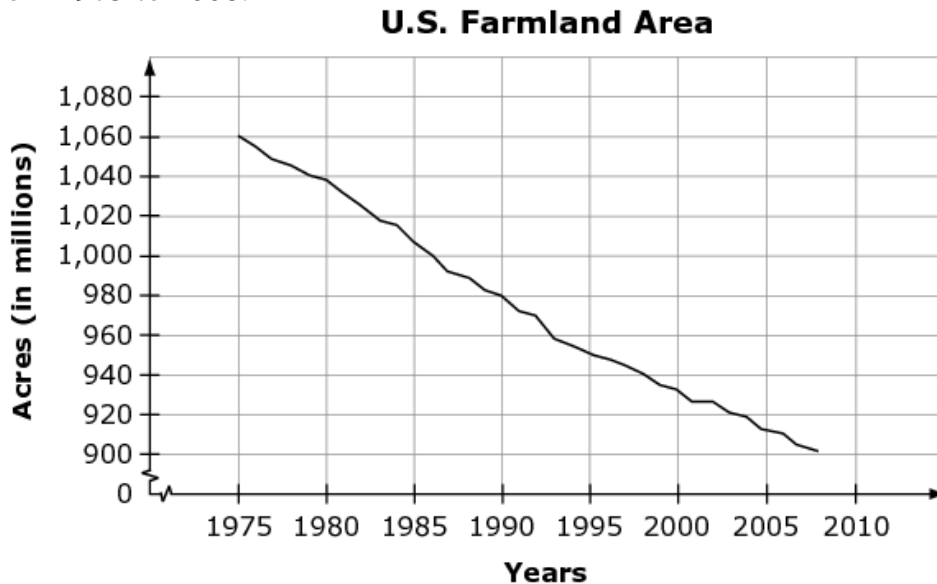


The diameter of the base is 5 inches. Which function can be used to find the diameter in inches of Ring r , where $1 \leq r \leq 7$?

[A] $d(r) = 5(0.87)^r$ [B] $d(r) = 0.87(r - 5)$ [C] $d(r) = 0.87(5)^r$

[D] $d(r) = 5(r - 0.87)$ [E] $d(r) = 5(0.13)^r$

44. The graph shows the number of acres, in millions, of farmland in the United States from 1975 to 2008.



Which statement describes the average rate of change of the graph?

- [A] The number of acres of farmland in the United States decreases by 0.21 million each year.
- [B] The amount of farmland in the United States decreases by 4.8 million acres each year.
- [C] The time it takes the farmland in the United States to decrease by 160 acres is 33 years.
- [D] Every 5 years, the amount of farmland in the United States decreases by 20 acres.

45. The table below shows the average weight of a type of plankton after several weeks.

Time (weeks)	Weight (ounces)
8	0.04
9	0.07
10	0.14
11	0.25
12	0.49

What is the average rate of change in weight of the plankton from week 8 to week 12?

46. The golf scores of the players on two golf teams, Team A and Team B, are listed in order from lowest to highest below.

Team A: 65, 67, 67, 68, 70, 70, 70, 71, 74, 77, 78, 78, 81, 81, 82

Team B: 63, 65, 67, 68, 70, 70, 71, 73, 74, 77, 77, 77, 78, 81, 84

Which of the following statements is a correct comparison of Team B to Team A?

[A] Team B has a larger median and a smaller interquartile range.

[B] Team B has a larger median and the same interquartile range.

[C] Team B has a smaller median and a larger interquartile range.

[D] Team B has a smaller median and the same interquartile range.

47. A librarian in a large city collects data about his summer reading program. He collects data for two years, 2011 and 2012, on how many books are read each week. His ordered data sets are shown, in the table.

2011	2012
44,126	35,001
44,901	41,534
55,080	68,550
58,546	75,534
79,984	76,617
99,860	84,834

The librarian writes a summary about his data, as shown.

Fill in each blank with the appropriate word or phrase to complete the librarians's summary based on the data from the table.

If you compare the means, it appears that in 2011 _____ books were read on average in 2012. When the medians for the two years are compared, the data show that in 2011 _____ books were read than in 2012.

48. The first five terms of a sequence are **3, 9, 27, 81, and 243**.

Select all functions that define this sequence for all integers $n \geq 1$.

[A] $f(n) = 3n$

[B] $f(n) = 3^n$

[C] $f(n) = 3 \cdot 3^{n-1}$

[D] $f(1) = 3; f(n) = 3 \cdot f(n - 1)$

[E] $f(1) = 3; f(n) = 6 \cdot f(n - 1)$