

Name: _____ Period: _____

Mid Term Review - A

Multiple Choice

Identify the choice that best completes the statement or answers the question.

Simplify the expression.

- _____ 1. $-6 - 7(c + 10)$
a. $64 - 7c$ b. $-76 - 7c$ c. $4 - 13c$ d. $-16 - 13c$

- _____ 2. $5k^2(-6k^2 - 2k + 6)$
a. $-30k^3 + 3k^2 + 30k$ c. $-k^4 + 3k^3 + 11k^2$
b. $30k^4 - 10k^3 + 11k^2$ d. $-30k^4 - 10k^3 + 30k^2$

Simplify the product.

- _____ 3. $(x - 4)(x + 3)$
a. $x^2 - 7x - 12$ c. $x^2 - x - 12$
b. $x^2 + x - 12$ d. $x^2 - 12x - 1$
- _____ 4. The base of a triangle is $(6h + 16)$ centimeters. The height of the triangle is $(3h - 8)$ centimeters. Find the area of the triangle.
a. $(18h^2 - 96h - 64) \text{ cm}^2$ c. $(18h^2 + 64) \text{ cm}^2$
b. $(9h^2 - 16h - 64) \text{ cm}^2$ d. $(9h^2 - 64) \text{ cm}^2$

Factor the expression.

- _____ 5. $k^2 - 16h^2$
a. $(k + 4h)(k + 4h)$ c. $h^2(k + 4)(k - 4)$
b. $(k - 4h^2)(k + 4)$ d. $(k + 4h)(k - 4h)$
- _____ 6. $a^2 + ab - 56b^2$
a. $(a + 8b)(a + 7b)$ c. $(a + 8b)(a - 7b)$
b. $(a - 8)(a + 7b)$ d. $(a - 8b)(a - 7b)$
- _____ 7. $40p^2 - 13p - 36$
a. $(8p + 9)(5p + 4)$ c. $(8p - 9)(5p + 4)$
b. $(8p - 9)(5p - 4)$ d. $(8p + 9)(5p - 4)$

- _____ 10. Write $9 \cdot 9 \cdot 9 \cdot 9 \cdot 9 \cdot 9 \cdot 9$ using an exponent.
a. $9 \cdot 7$ b. 7^9 c. 99^7 d. 9^7

11. Suppose the population of a town is 2,700 and is growing 4% each year.
- Write an equation to model the population growth.
 - Predict the population after 12 years.
- $y = 4 \cdot 2,700^x$; about 129,600 people
 - $y = 2,700 \cdot 4^x$; about 4,323 people
 - $y = 2,700 \cdot 1.04^x$; about 4,323 people
 - $y = 2,700 \cdot 4^x$; about 45,298,483,200 people
12. You deposit \$400 in an account that earns 6% compounded annually (once per year). What is the balance in your account after 5 years? Round your answer to the nearest cent.
- \$535.29
 - \$2,120.00
 - \$520.00
 - \$693.56
13. A boat costs \$15,500 and decreases in value by 10% per year. How much will the boat be worth after 5 years?
- \$9,152.6
 - \$15,450
 - \$8,237.34
 - \$24,962.91

Write the expression using a single exponent.

14. $2^2 \cdot 2^8$
- 4^{10}
 - 2^{10}
 - 4^{16}
 - 2^{16}
15. $6^a \cdot 6^v$
- 6^{a+v}
 - 6^{av}
 - 36^{av}
 - 36^{a+v}
16. $\frac{144^{14}}{144^2}$
- 144^{16}
 - 144^{12}
 - 144^{28}
 - $144^{\frac{14}{2}}$
17. $\frac{x^{13}}{x^2}$
- $x^{\frac{13}{2}}$
 - x^{15}
 - x^{11}
 - x^{26}

Simplify the expression.

18. 14^{-4}
- $\frac{1}{14^4}$
 - 56
 - $\frac{1}{14}$
 - $\frac{1}{14^{-4}}$

Write the number in standard form.

19. A cell has an approximate diameter of 3.656×10^{-5} millimeters.
- 0.0003656
 - 0.0000003656
 - 0.000003656
 - 0.00003656

20. A scientist uses a spherical particle in an experiment. The diameter of Particle A is 3.09×10^{-5} centimeters.
- Write the diameter of Particle A in standard form.
 - What is the radius of Particle A? Express your answer in standard form.
- 0.0000309; 0.00001545 cm
 - 0.000309; 0.0000618 cm
 - 0.0000309; 0.0000618 cm
 - 0.000309; 0.00001545 cm

Simplify the expression.

26. $(-2)^5$
- 32
 - 16
 - 10
 - 32
27. -5^4
- 20
 - 125
 - 625
 - 625

Solve the equation.

28. $8d - 4d - 6d - 8 = 2d$
- 0
 - 1
 - 2
 - 4
29. $37 - 18 + 8w = 67$
- 6
 - 4
 - 7
 - 6

Solve the equation.

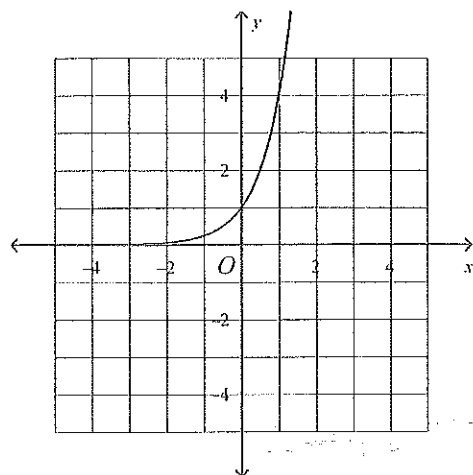
31. $78 = -2(m + 3) + m$
- 28
 - 42
 - 72
 - 84
32. $\frac{y - 5}{3} = 1$
- 2
 - 8
 - 18
 - 6
33. $\frac{w}{4} - 4 = 3$
- 4
 - 28
 - 3
 - 11
34. $\frac{d}{3} + 10 = 7$
- 51
 - 20
 - 0
 - 9
35. $-4n + 7 + 2n = 1$
- 1
 - 3
 - 3
 - 4

Factor the polynomial.

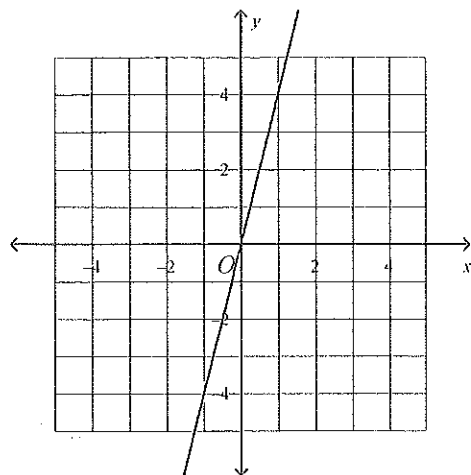
36. $24w^{12} + 64w^8$
- $8w^8(3w^4 + 8)$
 - $w^8(24w^4 + 64)$
 - $8(3w^{12} + 8w^8)$
 - $8w^7(3w^5 + 8w)$

40. Graph the function $y = 4^x$.

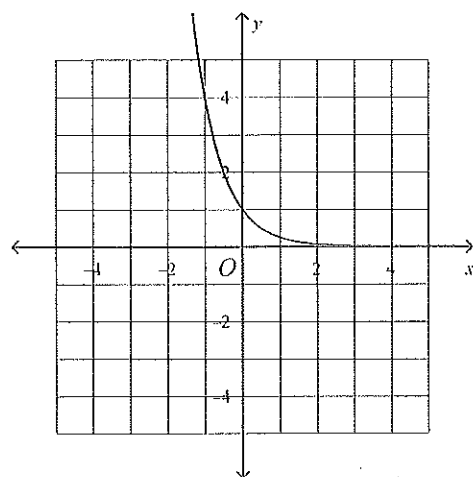
a.



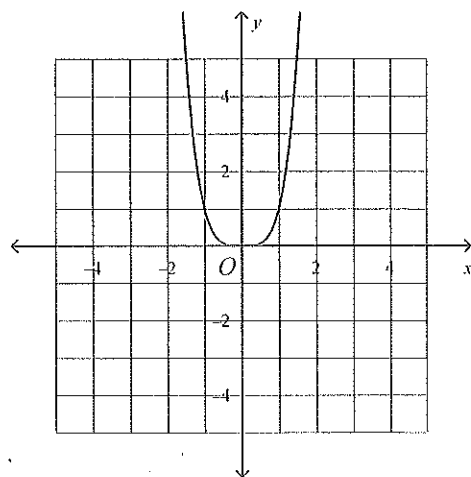
c.



b.



d.



Write an equation of a line with the given slope and y -intercept.

41. $m = 1, b = 4$

a. $y = 4x + 1$

b. $y = x - 4$

c. $y = -1x + 4$

d. $y = x + 4$

Is the second equation parallel to the first equation?

42. $y = \frac{1}{6}x + 8$

$-2x + 12y = -11$

a. Yes, since the slope are the same and the y -intercepts are the same.

b. No, since the y -intercepts are different.

c. Yes, since the slope are the same and the y -intercepts are different.

d. No, since the slopes are different.

Write an equation for the line that is parallel to the given line and that passes through the given point.

43. $y = \frac{3}{4}x - 9$; $(-8, -18)$

a. $y = \frac{3}{4}x + \frac{11}{2}$

c. $y = \frac{3}{4}x - 12$

b. $y = \frac{4}{3}x - 12$

d. $y = -\frac{4}{3}x + 12$

Write and solve an equation.

61. Mark wants to buy a skateboard that costs \$65. He plans to save \$5 per week. How many weeks w will it take him to save \$65?

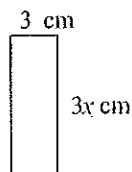
a. $5w = 65$; 13 weeks

c. $w - 65 = 5$; 70 weeks

b. $\frac{w}{5} = 65$; 13 weeks

d. $5 + w = 65$; 60 weeks

62. The perimeter of the rectangle is 24 cm. Find the value of x .



a. 3

b. 12

c. $\frac{8}{3}$

d. 18

63. The cost of a school banquet is \$90 for the room rental and \$14 per person attending. Write an expression to model the total cost of the banquet for p people. What is the cost for 70 people?

a. $14p + 90$; \$1,330

c. $90p + 14$; \$1,070

b. $90 + 14p$; \$1,070

d. $14 + 90p$; \$1,330

67. Suppose that y varies inversely with x . Write an equation for the inverse variation.
 $y = 6$ when $x = 8$

a. $y = \frac{x}{48}$

b. $y = 2x$

c. $x = \frac{y}{2}$

d. $y = \frac{48}{x}$

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Mid Term Review - B

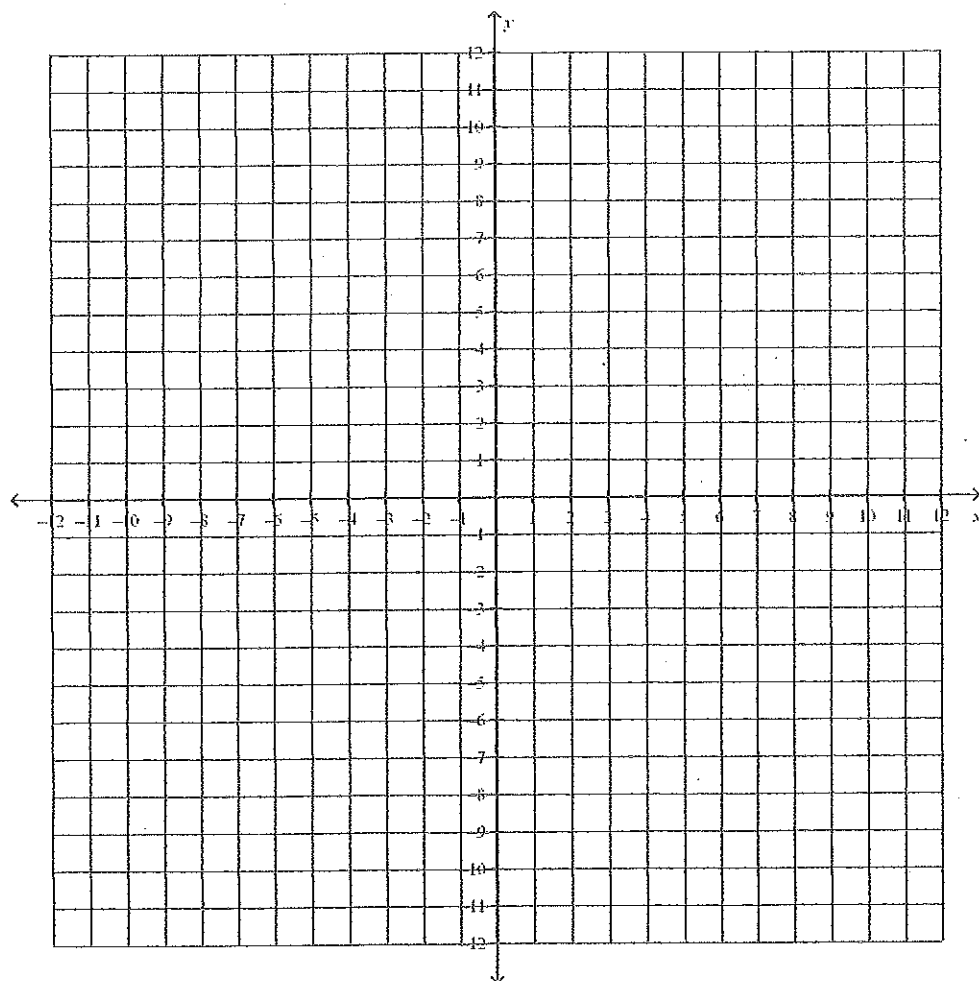
Short Answer

1. For the following quadratic equation: $y = x^2 - 2x - 3$

a. Calculate the x and y intercepts.

b. Find the vertex of the parabola

c. Graph all the solutions below:



2. A volunteer group unloads a truck full of pumpkins. The equation: $p = -90h + 495$ represents the amount of pumpkins p that remain in the truck after h hours.

a. How long will it take the volunteers to completely unload the truck?

b. How many pumpkins were on the truck to start with?

c. Write the equation in factored form.

d. How many pumpkins are unloaded each hour?

3. Simplify $5x^2 - 3x + 8 - (2x^2 - 4x + 9)$

5. A woman takes a dose of medicine and after 1 hour there is 90 mg of active medicine in her bloodstream. Two hours after she has taken the initial dose there is 85mg of active medicine left. *The medicine decays exponentially.*

a. What is the decay factor here? What is the decay rate? Write the equation that models the change.

6. Find the product: $(-4x^3y)^2(2y^2)$

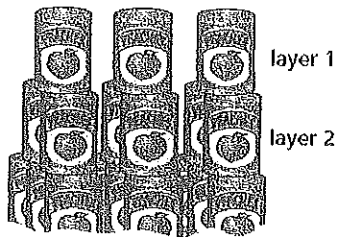
7. Find the quotient: $\frac{16x^{-3}y^7}{32x^5y^3}$

8. Find the product: $(2^{-3})(4^0)(2^4)$

9. Write 4.67×10^{-4} in standard form

Write 67,800,000 in scientific notation

11. Two students who work in a grocery store are making a display of canned goods. They build a tower of cans 12 layers deep. The first layer, at the top, contains three cans in a row. The second layer contains six cans, in two rows of three that support the first layer. The third layer has nine cans, in three rows of three that support the second layer.

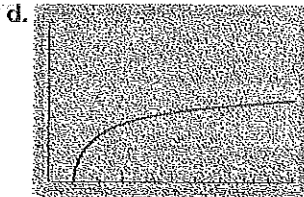
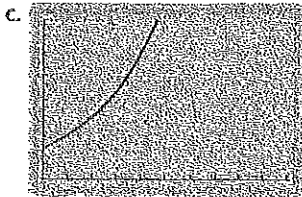
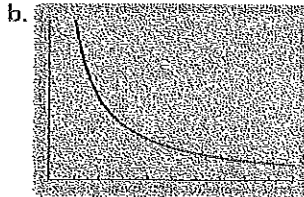
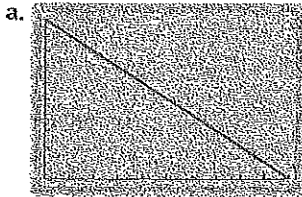


- a. How many cans are in layer 12, the bottom layer?
- b. Is the relationship described linear, exponential, or neither? Write an equation relating the variables.

Find equations of lines that are parallel and perpendicular to the line with the equation:

12. $y = -5x + 6$

13. Which of the following graph patterns would you expect to see if you were told that variables x and y are related by inverse variation? Explain your reasoning.



14. a. A sheet of paper with an area of 1 square unit is folded into thirds, and then thirds again, and so on. In the table, record the area of a region after each fold.

Number of Folds	Area of a Region
0	1
1	
2	
3	
4	
5	

- b. Describe the pattern of change in the table.
- c. Write an equation for the area of a region A after n folds.

Evaluate the expression for the given value of x .

15. $6x^2 + 13$ when $x = -10$

16. $0.5x^2 + x - 20$ when $x = 10$

Write two expressions that are equivalent to the given expression below.

18. $x(5 - 6) + 13x - 10$

19. The table below shows an exponential pattern.

x	0	1	2	3	4	
y	1	1.2	1.44	1,728		

- Continue the table by giving the values for the next column.
- Write an equation that represents the pattern in the table.
- What is the growth factor?
- What is the growth rate?

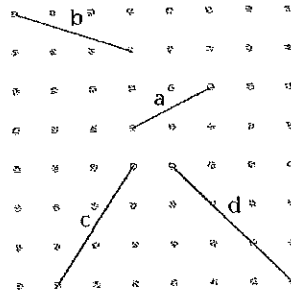
Use the tables to answer parts a and b.

- Describe the pattern in the table, and use the pattern to predict the missing y values.
- Tell whether the relationship between x and y is linear, exponential, quadratic or none of these. Explain how you know.

22.

x	-1	0	1	2	3	4	5
y	-5	0	3	4	3		

24. Find the slopes of all the line segments on the grid.



slope of line a:

slope of line b:

slope of line c:

slope of line d:

28. While graphing data at the center, the students found many linear relationships. They wanted to write equations for some of the lines. Find equations for lines that meet these conditions:

a. Pass through the points (0, 8) and (4, 13).

b. Slope -3 and passing through the point (1, 4).

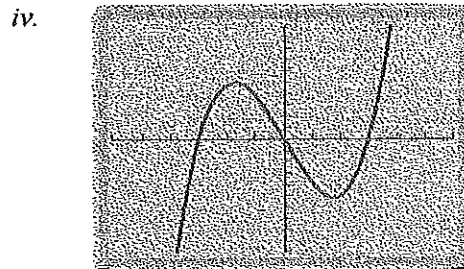
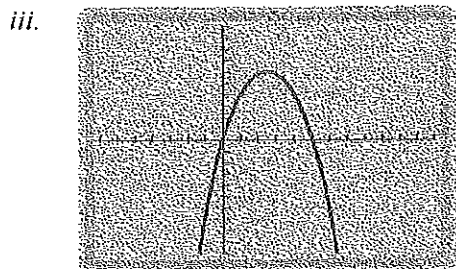
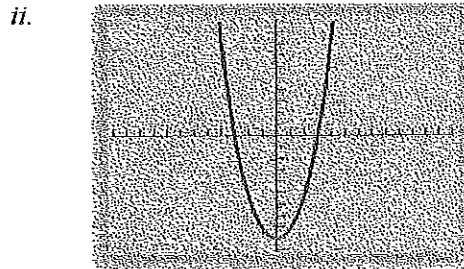
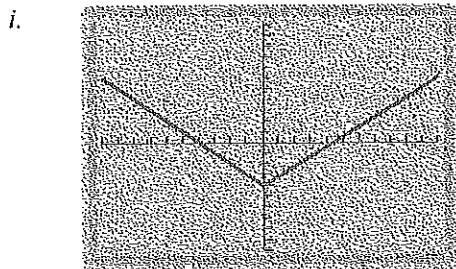
c. Pass through points (1, 1) and (3, 9).

Write the expression in factored form.

31. $x^2 + 12x + 36$

32. a. Which of the following (i, ii, iii, iv) could be graphs of quadratic relations? The scale on each axis is 1. Explain how you know.

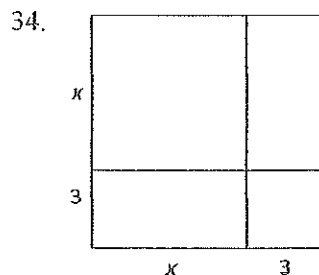
- b. For graph ii, what do you know about the values of a and c in the equation $y = ax^2 + bx + c$?



Write the quadratic equation in factored form.

33. $q = 72r^2 - 24r$

Write two expressions, one in factored form and one in expanded form, for the area of the large rectangle.



Study the pattern in the table. Tell whether the relationship between x and y is linear, exponential, or neither, and explain your answer. If the relationship is linear or exponential, write an equation for it.

36.

x	0	1	2	3	4	5
y	$\frac{1}{16}$	$\frac{1}{4}$	1	4	16	64

37. The manager of the Pine Cone restaurant wants to encourage more customers to come to his Monday night buffet. Right now no one comes when the price of the buffet is \$15.00. He believes that if he lowers the price, more people will come. He estimates that he will attract 1 more customer for every \$0.10 he drops the price.

- a. Make a table like the one below to calculate the income for certain numbers of customers.

Customers	Price per meal	Income
0	\$15.00	
1	\$14.90	
2	\$14.80	
3		
4		

- b. Write an equation for the income, I , based on the number of customers, n .

Several species of whale have been declared endangered. When the populations of a particular whale species fall dangerously low, biologists encourage governments to agree to a ban on hunting the species. Suppose that, in the year 2000, there were only 5,000 whales of a particular species and that the population was predicted to continue to decline as shown in the table.

Year (y)	Whales (w)
0 (2000)	5,000
1	4,500
2	4,050
3	3,645
4	3,281
5	2,952
6	2,657

- a. Which equation below models this population pattern?

A. $W = 5,000(0.1)^y$ B. $W = 5,000(0.9)^y$ C. $W = 5,000 - 500^y$ D. $W = 5,000^y$

- b. What is the decay factor for the relationship? Explain how you determined your answer.
- c. According to the prediction, what will the whale population be in 2007?
- d. Suppose the danger point for these whales comes when the population falls below 2,000 whales. When will this happen? Explain your answer.

Solve the equation and check your answer.

39. $4x + 19 = 26 - 3x$

40. Which of these are quadratic functions?

- a. $x^2 + 7$ b. $2(x + 7)$ c. $x(x + 7)$
- d. $(x + 4)(x - 2)$ e. $(6 + 5)(x + 2)$ f. $(x - 3)(4)$
- g. $2x + 9$ h. $x^2 + 9$ i. $x + x + 9$

42. The table below shows an exponential pattern.

x	0	1	2	3	4	
y	1	6	36	216	1,296	

- a. Continue the table by giving the values for the next column.
- b. Write an equation that represents the pattern in the table.
- c. What is the growth factor? Explain how you determined the growth factor.

45. The budget for the Grant Center assumes a linear relationship between the number of student visitors and daily operating cost. Some sample (*number of students, operating cost*) values are given in the next table.

Number of Students	0	10	20	40
Daily Operating Cost (\$)	450	600	750	1050

- a. Use the given data to write an equation showing how operating cost, C , depends on number of students, x . Explain or show how you arrived at the equation.

Write equations or inequalities that match each of the following questions. Then do the required calculation or solve the equation to find each answer.

- b. For what number of student visitors will daily operating cost be \$690?

- c. What will be the operating cost on a day with 12 student visitors?

- d. How many students can visit the center if the operating cost is to be at most \$1,000?

47. The height in meters of a model rocket t seconds after it is launched is approximated by the equation $h = t(50 - 3t)$.

- a. How high is the rocket 5 seconds after being launched?

Write an equation for the line shown. Identify the slope and y -intercept.

50.

