Student Name: _____ Class: _____

Revision Worksheet

Grade 10 Advanced Mathematics (2019-2020)

Chapter 1 – Linear Systems and Matrices

Instructions: *Read all questions carefully. Answer all questions.*

Lesson 1.1

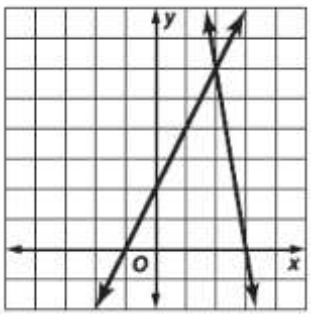
1. Two lines have the following equations:

$$4x + 3y = 7$$
$$x + 2y = -2$$

At what point do they intersect?

A. (1, 1) B. (0, -1) C. (4, -3) D. (6, -4)

2. Look at the graph below. Which of these statements describes the relationship between the two lines?



A They intersect at (6, 2).
B They intersect at (0, 2).
C They intersect at (3.5, 0).
D They intersect at (2, 6).

3. Farah bought 15 tickets to a movie, where adult tickets cost AED 6 and senior citizen tickets cost AED 4. She spent a total of AED 76. Which system of equations will determine the number of adult tickets, a, and the number of senior citizen tickets, s, that Farah purchased?

A. $a + s = 15$, $10as = 76$
B. $a + s = 15$, $6a + 4s = 76$
C. $a + s = 15$, $4a + 6s = 76$
D. $a + s = 15$, $a + s = 76$

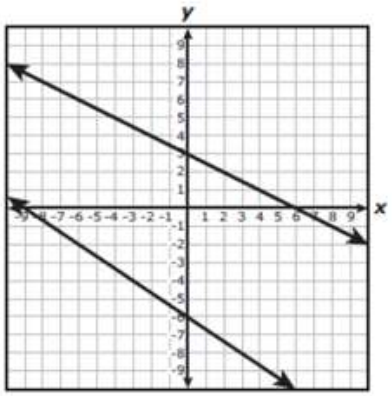
4. What is the value of x in the solution to the system of equations below?

$$x = 2y - 8$$
$$4x + y = 13$$

A. 5 B. 2 C. (2, 5) D. 7

5. Which of the following graphs best represents a system of equations that has no solution?

A



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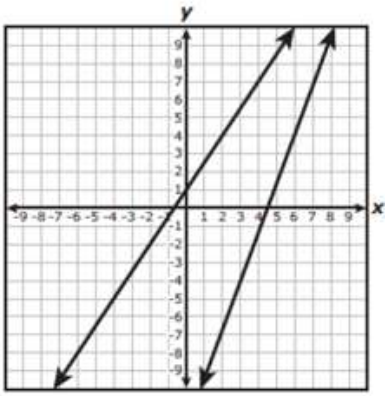
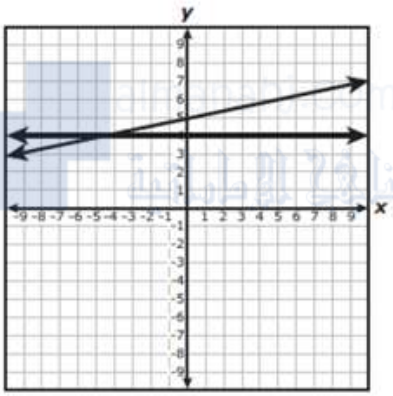


B



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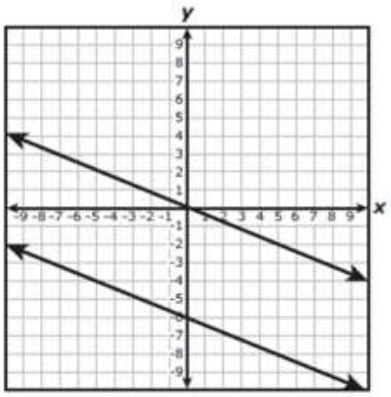
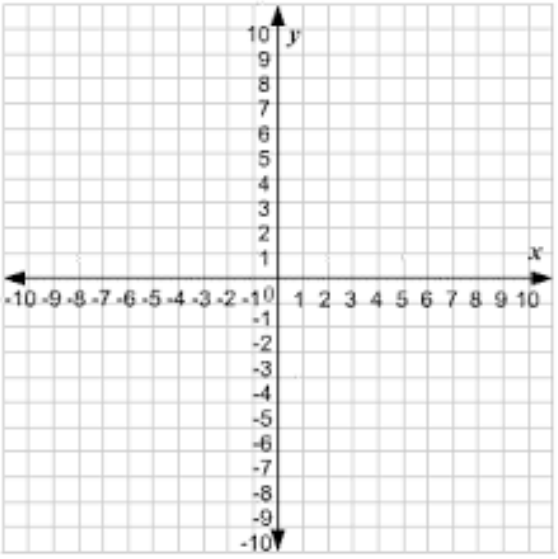


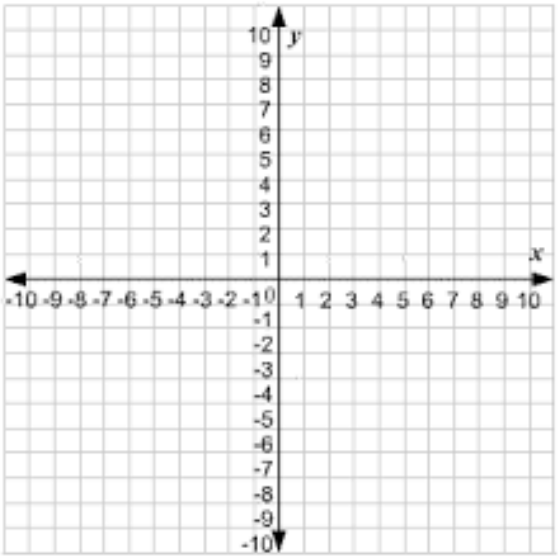
6. Solve the system of equations by graphing.

$$-3x + 2y = 6$$
$$y = 3$$



7. Solve the system of equations by graphing.

$$y = -\frac{5}{2}x - 1$$
$$y = \frac{1}{2}x + 5$$



8. Solve each system of equations by using either using substitution or elimination.

a) $5x - 3y = 23$

$2x + y = 7$

b) $-3y = 4x + 11$

$2x + 3y = -7$

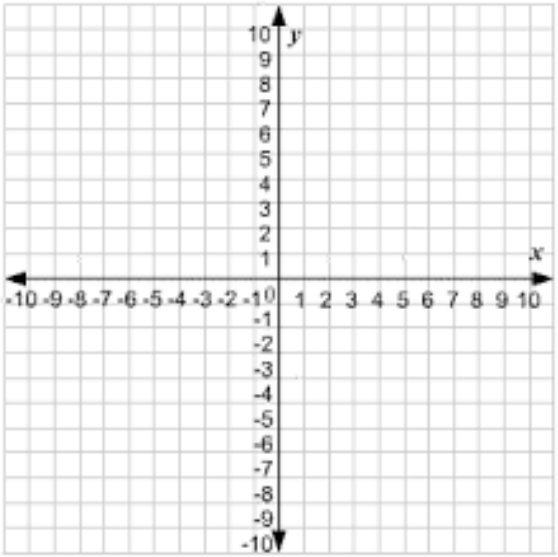
9. At an office supply store, Jamal bought 3 notebooks and 5 pens for $AED\ 13.75$. If a notebook costs $AED\ 1.25$ more than a pen, how much does a notebook cost? How much does a pen cost?

10. A used bookstore also started selling used CDs and videos. In the first week, the store sold a combination of 40 CDs and videos. They charged AED 4 per CD and AED 6 per video and the total sales were AED 180. Determine the total number of CDs and videos sold.

Lesson 1.2

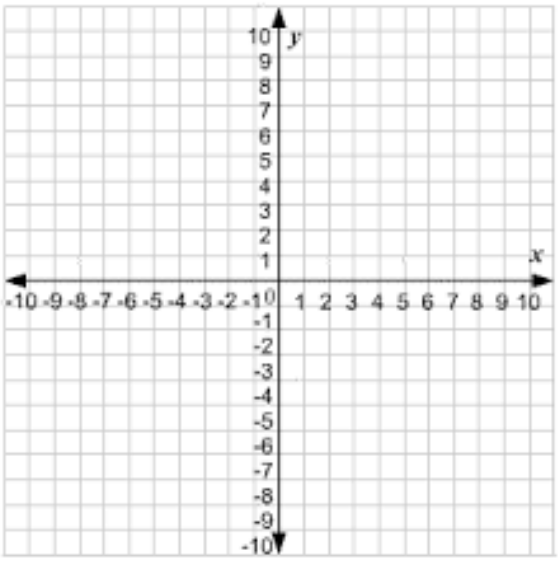
11. Solve the system of inequalities by graphing.

$$y \leq -2x + 5$$
$$y \leq -4$$

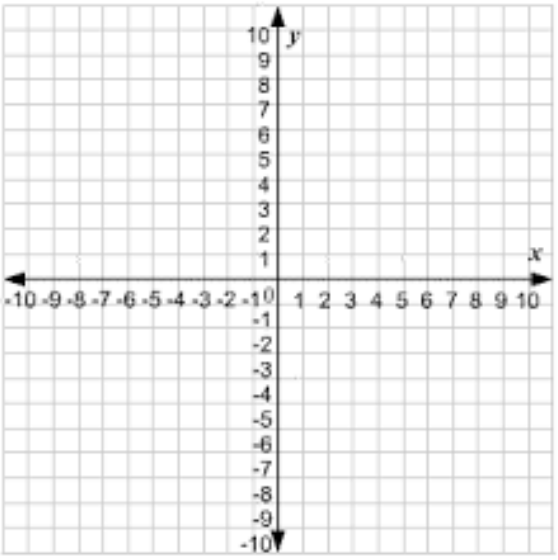


12. Solve the system of inequalities by graphing.

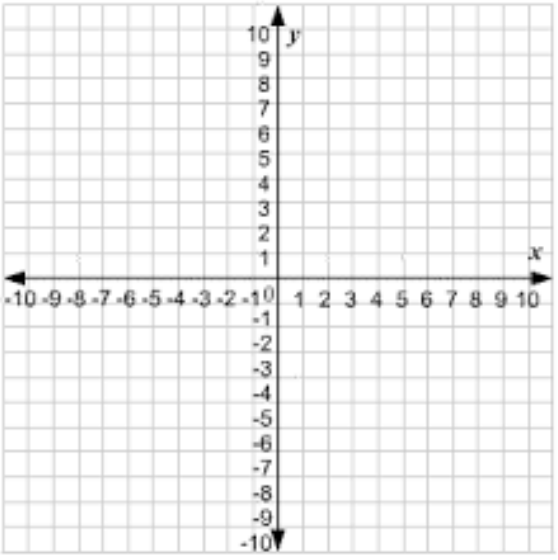
$$y \geq \frac{2}{3}x - 1$$
$$3y - 2x \leq -24$$



13. Sarah is selling bracelets and earrings to make money for summer vacation. The bracelets cost AED 2 and the earrings cost AED 3. She needs to make at least AED 60. Sarah knows she will sell more than 10 bracelets. Write inequalities to represent the income from jewelry sold and number of bracelets sold and display it on the graph below.



14. Salama has AED 50 in a savings account at the beginning of the summer. She wants to have at least AED 20 in the account by the end of the summer. She withdraws AED 2 each week for food, clothes, and movie tickets. Write an inequality that expresses Salama's situation and display it on the graph below. For how many weeks can Salama withdraw money?



Lesson 1.3

15. A manufacturer of ski clothing makes ski pants and ski jackets. The profit on a pair of ski pants is AED 2.00 and on a jacket is AED1.50. Both pants and jackets require the work of sewing operators and cutters. There are 60 minutes of sewing operator time and 48 minutes of cutter time available. It takes 8 minutes to sew one pair of ski pants and 4 minutes to sew one jacket. Cutters take 4 minutes on pants and 8 minutes on a jacket. Find the maximum profit and the amount of pants and jackets to maximize the profit.

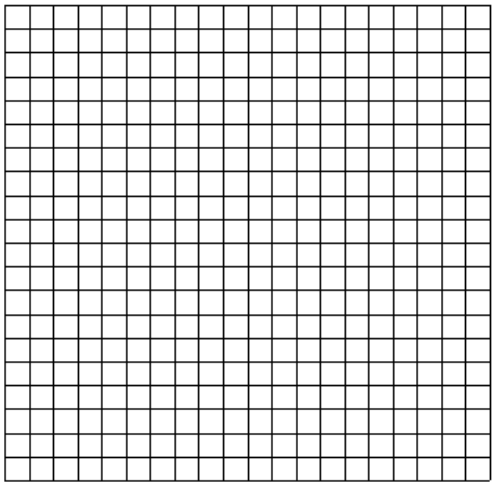
    a. Let x = ski pants and y = ski jackets. Since there cannot be negative pants or jackets, write two inequalities to represent that situation.

    b. Express the cutters' time to make pants and jackets as an inequality.

    c. Express the sewing operators' time to make pants and jackets as an inequality.

    d. Write an equation for the anticipated profit.

    e. Graph the constraints.



    f. Use the corner points to find the maximum profit.

    g. What is the maximum profit?

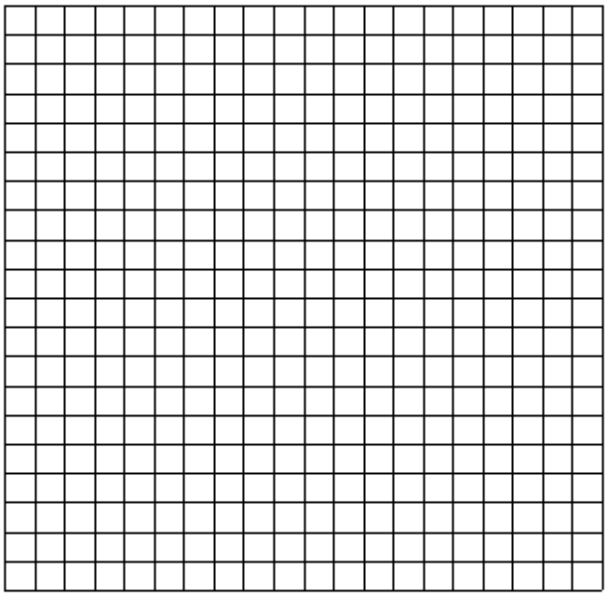
    h. How many ski pants and ski jackets have to be made to maximize profit?

16. A farmer has a field of 70 acres in which he plants potatoes and corn. The seed for potatoes costs AED 20/acre, the seed for corn costs AED 60/acre and the farmer has set aside AED 3000 to spend on seed. The profit per acre of potatoes is AED 150 and the profit for corn is AED 50 an acre. Find the optimal solution for the farmer.

a. Write the constraints for the problem.

b. Write the profit equation.

c. Graph the constraints and find the corner points.



d. To find the **optimal solution** you are looking for the maximum. Use your corner points to find the maximum profit.

e. What is the **optimal solution** (the max profit and the amount of corn and potatoes it take to get it)?

Lesson 1.4

17. Solve the system of equations.

$$x + y + z = 4$$
$$x + 3y + 3z = 10$$
$$2x + y - z = 3$$

18. Seats closest to an amphitheater stage cost AED 30. The seats in the next section cost AED 25, and lawn seats are AED 20. There are twice as many seats in section B as in section A. When all 19,200 seats are sold, the amphitheater makes AED 456,000. Write and solve a system of equations to determine how many seats are in each section of the amphitheater.

Lesson 1.5

19. Write an example for each type of the following Matrices.

a) Row matrix **b)** Column matrix

c) Square matrix

20. Find the value of a, b and c if the following two matrices are equal.

$$\begin{bmatrix} a+3 & -1 \\ 4 & 5 \end{bmatrix} = \begin{bmatrix} 6 & b \\ c-3 & 5 \end{bmatrix}$$

21. Write the dimensions of each matrix.

a) $\begin{bmatrix} -3 & 17 & 6 \\ 5 & 7 & 6 \\ -2 & 3 & 8 \end{bmatrix}$ **b)** $\begin{bmatrix} 4 & 3 \\ 6 & 1 \\ 8 & 0 \end{bmatrix}$ **c)** $\begin{bmatrix} -3 & 5 & 2 \end{bmatrix}$

22. Solve each equation.

a) $\begin{bmatrix} 2x & 3 & 3z \end{bmatrix} = \begin{bmatrix} 5 & 3y & 9 \end{bmatrix}$

b) $\begin{bmatrix} \mathbf{4x} \\ \mathbf{5} \end{bmatrix} = \begin{bmatrix} \mathbf{15 + x} \\ \mathbf{2y - 1} \end{bmatrix}$

23. What is the a_{23} entry in matrix A:

$$A = \begin{bmatrix} 1 & 2 & 3 & 4 \\ 12 & 3 & 4 & 1 \\ 13 & 14 & 1 & 2 \end{bmatrix}$$

Lesson 1.6

Perform the indicated operation. If the matrix does not exist, write impossible.

24. $\mathbf{2}\left(\begin{bmatrix} \mathbf{4} & \mathbf{0} \\ \mathbf{-1} & \mathbf{5} \end{bmatrix} + \begin{bmatrix} \mathbf{-1} & \mathbf{9} \\ \mathbf{3} & \mathbf{4} \end{bmatrix}\right)$

25. **If A =** $\begin{bmatrix} \mathbf{16} & \mathbf{2} \\ \mathbf{-9} & \mathbf{8} \end{bmatrix}$**, B =** $\begin{bmatrix} \mathbf{-4} & \mathbf{-1} \\ \mathbf{-3} & \mathbf{-7} \end{bmatrix}$ **and C =** $\begin{bmatrix} \mathbf{8} \\ \mathbf{6} \end{bmatrix}$**, find**

i) A – B

ii) B + C

iii) 2A + 3B

26. Sultan, Tariq and Samy have had two tests in their Math class. The table shows the test grades for each student.

Student	Test 1	Test 2
Sultan	85	72
Tariq	75	74
Samy	96	83

a) Write a matrix for the information from each test.
b) Find the sum of the scores from the two tests expressed as a matrix.
c) Express the difference in scores from test 1 to test 2 as a matrix.

Lesson 1.7

27. Determine whether each matrix product is defined. If so, state the dimensions of the product.

1. $A_{2\times 4} \cdot B_{4\times 3}$ 2. $C_{5\times 4} \cdot D_{5\times 4}$ 3. $E_{8\times 6} \cdot F_{6\times 10}$

28. Find each product if possible.

a) $\begin{bmatrix}1 & 2\end{bmatrix} \cdot \begin{bmatrix}3\\-7\end{bmatrix}$

b) $\begin{bmatrix}3 & 1 & 2\\4 & 0 & 2\end{bmatrix} \cdot \begin{bmatrix}1 & 2\\0 & 3\\5 & 1\end{bmatrix}$

29. If X = $\begin{bmatrix}-10 & -3\\2 & -8\end{bmatrix}$, Y = $\begin{bmatrix}-5 & 6\\-1 & 9\end{bmatrix}$

Determine whether the equation XY = YX is true for the given matrices.

30. What are the dimensions of the matrix that results from the multiplication shown?

$$\begin{bmatrix} a & b & c \\ d & e & f \\ g & h & i \end{bmatrix} \cdot \begin{bmatrix} 2 \\ 3 \\ 4 \end{bmatrix}$$

a) 3 × 1 b) 3 × 3 c) 2 × 1 d) 1 × 3

31. Mahmoud bought 1 liter of milk, 2 apples, 4 frozen dinners, and 1 box of cereal. The following matrix shows the prices for each item, respectively.

$$[AED\ 2.59 \quad AED\ 0.49 \quad AED\ 5.25 \quad AED\ 3.99]$$

Use matrix multiplication to find the total amount of money Mahmoud spent at the grocery store.

Lesson 1-8

32. Evaluate $\begin{vmatrix} -6 & -7 \\ 10 & 8 \end{vmatrix}$

33. Evaluate $\begin{vmatrix} -8 & -4 & 4 \\ 0 & -5 & -8 \\ 3 & 4 & 1 \end{vmatrix}$ using diagonals.

34. To raise money for their rowing club, Halima, Aisha, and Fatima are advertising a car wash at three different street corners in a neighborhood. On a map, the coordinates for the corners are $(3,15), (6,4), and\ (11,9)$. Each unit represents 0.5 kilometer. What is the area of the neighborhood in which they are advertising?

35. Solve the system by using Cramer's Rule $8x - 5y = 70$
$9x + 7y = 3$

36. Solve the system by using Cramer's Rule $3x + 5y + 2z = -7$
$-4x + 3y - 5z = -19$
$5x + 4y - 7z = -15$

Lesson 1-9

37. Determine whether the given matrices are inverses

$A = \begin{bmatrix} 2 & 1 \\ -1 & 0 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 \\ 2 & 1 \end{bmatrix}$

38. Find the inverse of the given matrix, if it exists. $\begin{bmatrix} 6 & -3 \\ -1 & 0 \end{bmatrix}$

39. Use a matrix equation to solve the system of equations $4x - 2y = 22$

$6x + 9y = -3$

40. Khalfan had 25 coins in total made up of 25 fils coins and 10 fils coins. The total value of all the coins was AED 4. How many 25 fils coins and 10 fils coins did Khalfan have?

Student Name: _____ Class: _____

Revision Worksheet

Grade 10 Advanced Mathematics (2019-2020)

Chapter 2 – Quadratic Functions and Relations

Instructions: *Read all questions carefully. Answer all questions.*

Graphing Quadratics from Vertex Form

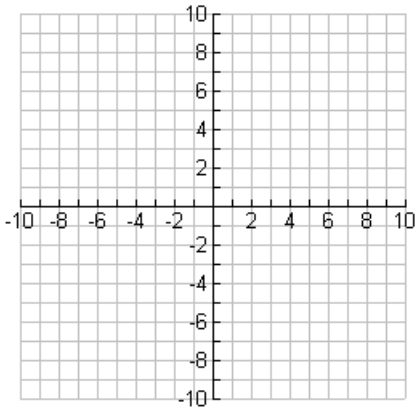
1. In unit 2, we looked at transformations → Let's explore TI Interactive!

Quadratic Equation: $y = a(x-h)^2 + k$	
a	
h	
k	
Vertex	

2. Examples together: Let's translate each parabola to find the vertex, then use the "a" value to graph!

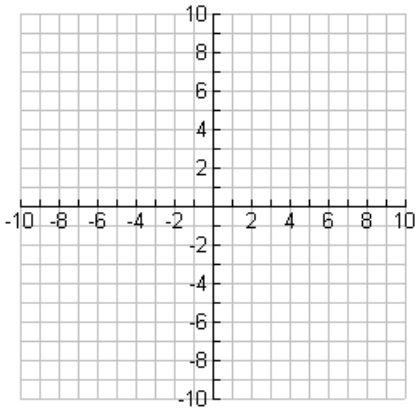
a) $y = (x-2)^2 + 3$

Vertex: _____



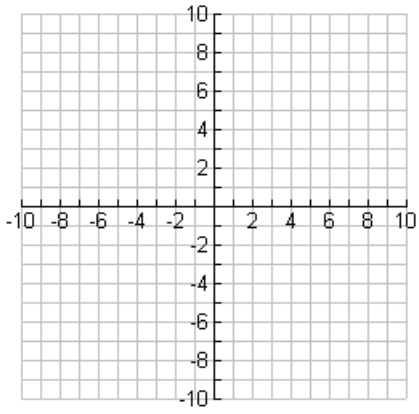
b) $y = 3(x+1)^2 - 4$

Vertex: _____



c) $y = -\frac{1}{4}x^2 + 2$

Vertex: _____



Graphing from Standard Form & Identifying the Vertex

Standard Form: $y = ax^2 + bx + c$		
	Property	**Example:** $y = -x^2 - 2x + 2$
a positive		
a negative		
Max or Min?		
Vertex		
Axis of Symmetry		
y-intercept		

1. How to graph $f(x) = -x^2 - 2x + 2$

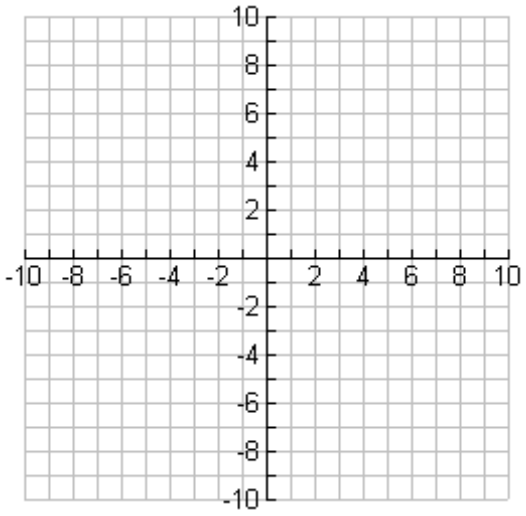
Step 1: Plot the _____

Step 2: Sketch the axis of symmetry.

Step 3: Plot the _____

Step 4: Use symmetry to find _____

Step 5: Sketch!



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

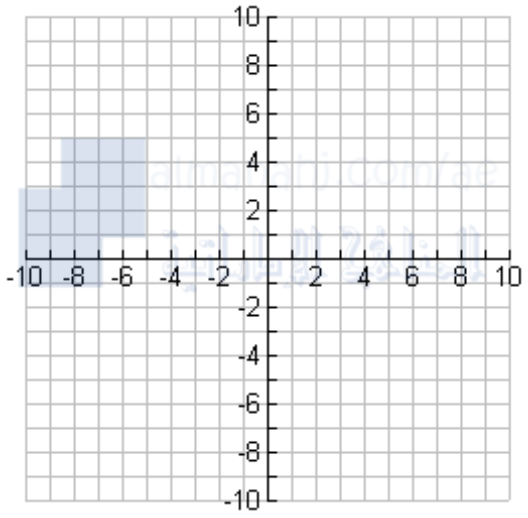
Direction: _____

Axis of Symmetry: _____

Vertex: _____

Max or Min (and value): _____& _____

y-intercept: _____



2) $f(x) = -2x^2 - 4x - 2$

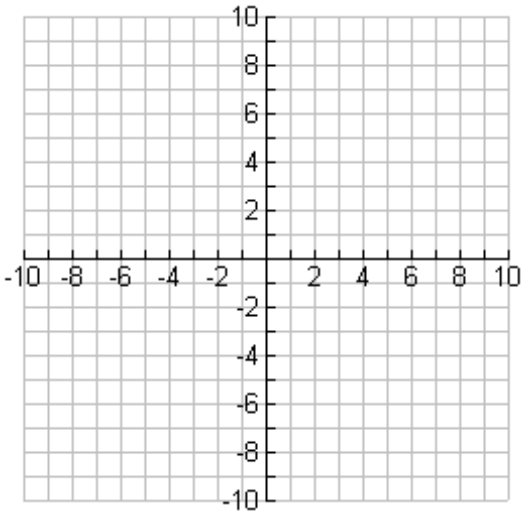
Direction: _____

Axis of Symmetry: _____

Vertex: _____

Max or Min (and value): _____& _____

y-intercept: _____



WoRd: A record label uses the function $a(t) = -90t^2 + 8100t$ to model the sales of a new release. The number of albums sold is a function of time, t, in days. On which day were the most albums sold? What is the maximum number of albums sold on that day?

An airline sells a 3-day vacation package. Sales from this vacation package can be modeled by the quadratic function $s(p) = -40p^2 + 32000p$. Sales are dependent on the price, *p*, of the package. If the price is set too high, the package won't sell, but if the price is too low, prospective buyers will think it is a scam.

a. At what price, *p*, does the company have the greatest revenue? _____

b. What are the maximum sales possible based on this model? _____

c. What is the revenue from the vacation package if the price is set at $800? _____

Completing the Square: Change from Standard to Vertex

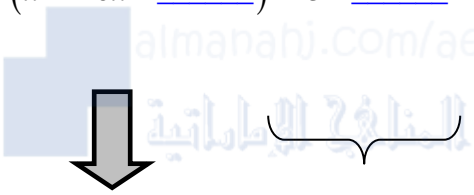
1. To start class yesterday, we converted the vertex form into standard form…

$y=(x-3)^2+2$

2. What if we had to work backwards? $y=x^2+10x-13$.

This is known as _____ the square.

$y=(x^2+10x+\_\_\_\_\_)-13-\_\_\_\_\_$ Fill the blanks with _____



Vertex is: _____

3. One more together: This time there is a number front of x^2 ($a\neq 1$). Factor it out!!

$f(x)=3x^2-6x-15$

Factor: Add & Subtract: _____

Vertex: _____

Directions: Fill in the blank for each expression in order to complete the square.

1) $x^2 + 4x + \_\_\_\_\_$ **2)** $x^2 + 2x + \_\_\_\_\_$ **3)** $x^2 - 8x + \_\_\_\_\_$

Directions: Write each function in vertex form, then identify its vertex.

1) $f(x) = x^2 - 6x - 2$ **5)** $f(x) = x^2 - 4x + 1$

6) $f(x) = 3x^2 - 12x - 4$ **7)** $f(x) = -2x^2 - 16x + 4$

Factoring Review – GCF, Diff of Squares, Trinomials

Factor the following! Remember, you can FOIL to check!

1) $x^2 - 25$	**2)** $3x^2 + 12x$	**3)** $x^2 - 9x + 14$
4) $x^2 - 2x - 48$	**5)** $x^2 - 9$	**6)** $5x^2 + 25$

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1. Review: Distribute and FOIL

a) $3x(4x-7)$ **b)** $(x-5)(x+6)$

2. Today we are going to tackle three types of factoring.

2 Terms		3 Terms
GCF	**Difference of 2 Squares**	**Guess and Check**
$2x+8$	$4x^2 - 49$	$x^2 + 11x + 30$
$3x^3 + 15x^2$	$a^2 - 4$	$x^2 - x - 56$

Factor by removing a common factor:

1. $5x^2 + 10x =$

2. $-3x^2 + 12x =$

3. $-4x^2 - 24 =$

4. $9x^4 + 18x^2 =$

5. $20x^2 - 120x + 240 =$

Factor using difference of squares, $a^2 - b^2 = (a+b)(a-b)$:

6. $x^2 - 64 =$

7. $x^2 - 121 =$

8. $9x^2 - 25 =$

9. $x^2 - 4y^2 =$

10. $(x+4)^2 - 9 =$

Factor:

11. $x^2 - x - 30 =$

12. $x^2 + 7x - 8 =$

13. $x^2 - 12x + 20 =$

14. $x^2 + 6x - 27 =$

15. $x^2 + 10x + 24 =$

Factor these various types:

16. $x^2 - 10x + 16 =$

17. $7x^3 - 49x =$

Check by distributing your answer:

1.

2.

3.

4.

5.

Check by FOILing your answer:

6.

7.

8.

9.

10.

Check by FOILing your answer:

11.

12.

13.

14.

15.

18. $x^2 + 25 =$

19. $16x^2 - 64 =$

20. $3x^2 + 6x - 45 =$

Factoring Review – Perfect Square Trinomials

n	1	2	3	4	5	6	7	8	9	10	11	12	13	14
n^2														

What exponent does a variable have to have in order for it to be a perfect square? _____!

Perfect Square Trinomials

→ $(x+y)^2 =$ _____ → $(x+y)^2 =$ _____

Examples: 1) $9x^2+30x+25$ 2) $x^2-14x+49$

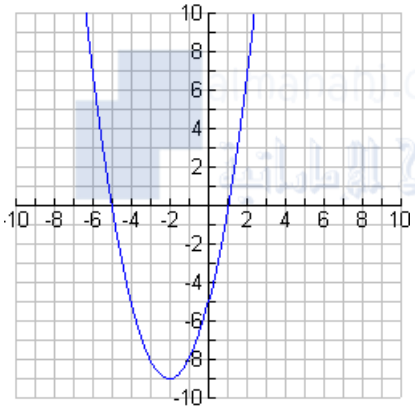
3) $4x^2-28xy+49y^2$ 4) $25x^2+60x+36$

5) $x^2-10x+25$ 6) $4x^2-12x+9$

Zero Product Property & Writing Eq. when Given Roots

Factor each expression, if possible. If not possible, write "not factorable"

1. Reminder: The graph of a quadratic equation looks like a _____. Today, we are interested in finding the place(s) where the graph crosses the _____. These values are known as the _____ or the _____ of the function (there is a slight difference, but we don't need to worry about the technicality).



Today's Goals:

1) Given the equation, find the roots/zeros/solutions

Zero _____ Property: If $(x-1)(x+5)=0$, then…

2) Backwards → Given the roots, write the equation

Write as a product and _____ it out!

2. Examples together: Find the zeros of each function by factoring

a) $f(x)=x^2-x-20$

b) $g(x)=2x^2+9x+4$

3. Examples together: Write a quadratic function in standard form for each given set of zeros.

a) 6 and -3

b) -2 and 7

Zeros from Graphing Calculator and Vertical Motion

1) Yesterday (and probably last year, too!) you learned how to find the zeros of a quadratic function. Today we are going to look at a real world application of this: _____ motion

$$h(t) = -16t^2 + v_0 t + h_0$$

Constant due to Earth's gravity in ft/s^2

Initial vertical velocity in ft/s (at $t = 0$)

Initial height in ft (at $t = 0$)

How hard you kick/throw/shoot the object from the beginning

is 0 (disappears) when…

Example #1: A soccer ball is kicked from the ground level with an initial velocity of 32 ft/s. After how many seconds will the ball hit the ground?

Step 1: Write the general projectile function →

Step 2: Plug in anything you can →

Step 3: When does it mean for the ball to hit the ground? Answer: _____!

So, set …

Example #2: Marilyn hit a golf ball on the ground with her driver. Use the general function for a projectile to write a function that shows the height in feet of her golf ball as a function of time. The ball was hit with an initial vertical velocity of 100 feet per second.

How long will Marilyn's ball stay in the air?

Example #3: A rocket is launched from the ground with an initial velocity of 144 ft/sec. (All work is to be done without using a calculator to graph. You may check your answers by graphing.)

a. Write a function that represents this situation.

b. At what time(s) will the rocket be 320 feet in the air?

c. What is the maximum height of the rocket? How long does it take for the rocket to reach this height?

d. When will the rocket hit the ground?

Closure: What is the general projectile function? Explain each term. What is the function used for?!

Solve by factoring:

1) $3x^2 - 20 = -11x$

2) $x^2 + 9x - 36 = 0$

3. Use completing the square to put this equation in vertex form. Then find the vertex.

$f(x) = x^2 + 8x - 3$

Vertex form: $f(x) =$ _____ Vertex:_____

For the problems below, make sure your answers are in the right format (point, line, number, etc.)!
Find the information below then sketch the graph:

4. $f(x) = (x-1)^2 - 5$

which way does it open?_____

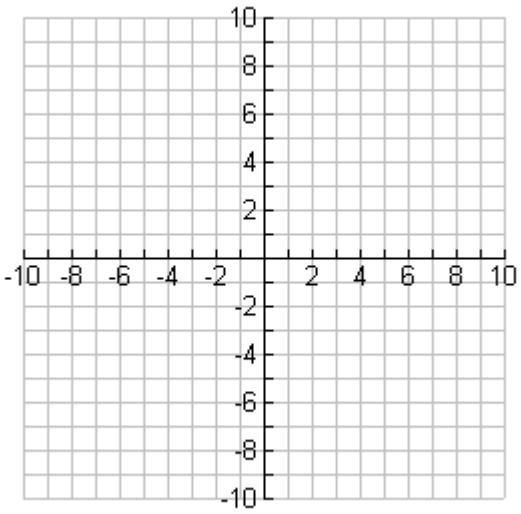
Has a MAX or MIN?_____

Vertex: _____

Axis of Symmetry:_____

Max / Min value:_____

Use the info to sketch the graph:



5. $f(x) = x^2 + 6x + 5$

which way does it open?_____

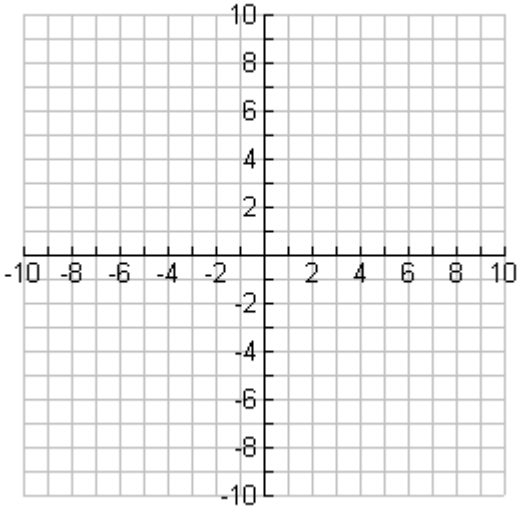
Has a MAX or MIN?_____

Vertex: _____

Axis of Symmetry:_____

Max / Min value:_____

Use the info to sketch the graph:



6. Here's a graph…tell me the info:

Which way does it open?

Has a MAX or MIN?_____

Vertex: _____

Axis of Symmetry:_____

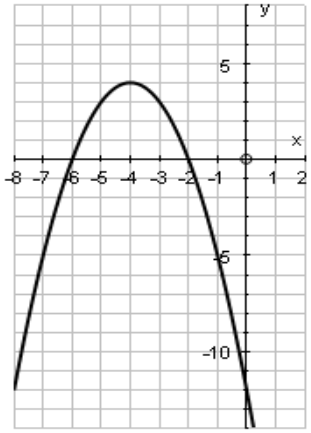
Max / Min value:

y-intercept:_____

x-intercepts:_____

Given that a = -1, write the equation in vertex form:

_____



The Quadratic Formula

The **quadratic formula** is derived from completing the square to solve

$ax^2 + bx + c = 0$ for x.

The **quadratic formula** is used to solve any quadratic equation in **standard form.**

The Quadratic Formula:

Given $ax^2 + bx + c = 0$, $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

Note: Since the quadratic formula is frequently used in algebra, it is common to memorize the formula for instant recall.

Using the quadratic formula to solve any quadratic equation:

1. If necessary, rewrite the given equation in standard form: $ax^2 + bx + c = 0$
2. Identify a, b, and c from the standard form.
3. Recall the quadratic formula: $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
4. Substitute a, b, and c in the quadratic formula to evaluate x.
5. Write an appropriate solution set.
6. Check when directed to do so.

Solve using the quadratic formula:

1. $x^2 + 7 = 3x$

2. $2x^2 + 5x = 3$

3. $4x^2 - 20x + 25 = 0$

Quadratic Inequalities

Quadratic inequalities in one variable are expressed in one of the following forms:

1. $ax^2 + bx + c > 0$
2. $ax^2 + bx + c \geq 0$
3. $ax^2 + bx + c < 0$
4. $ax^2 + bx + c \leq 0$

A **critical number** in a quadratic inequality is a number that makes the given polynomial **equal to zero**. It is used to help determine those values that make the inequality true.

Finding the critical numbers on a number line for a quadratic inequality:

1. Set $ax^2 + bx + c = 0$ and solve for x by factoring.
2. The critical numbers are located on a number line to prepare for graphing.

Finding the solution of a quadratic inequality using a number line analysis:

1. Express the inequality in standard form.
2. Determine the critical numbers.
3. Organize a chart to determine appropriate intervals found by locating critical numbers on a number line.
4. Choose one test number from within each interval and see how it affects the sign of each factor. Use multiplication sign rules to determine whether or not the standard form inequality tests true.

   Note: A **positive** product is always **> 0**.
   A **negative** product is always **< 0**.
5. Shade intervals that test true.
6. Use (or) for those critical numbers that are excluded from the solution: $ax^2 + bx + c > 0$ or $ax^2 + bx + c < 0$.

   Use [or] for those critical numbers that are included in the solution: $ax^2 + bx + c \geq 0$ or $ax^2 + bx + c \leq 0$.
7. Use set builder notation and/or interval notation to express the solution.

<u>Problems</u> - Solve:

1. $x^2 + x - 12 \geq 0$

2. $y^2 + 6y + 5 < 00$

Student Name: _____ Class: _____

Revision Worksheet

Grade 10 Advanced Mathematics (2019-2020)

Chapter 1 – Linear Systems and Matrices

Instructions: *Read all questions carefully. Answer all questions.*

Remainder Theorem: If a polynomial P(x) is divided by $(x - a)$, then the remainder is P(a).

Factor Theorem: The binomial $(x - r)$ is a factor of the polynomial P(x) if and only if P(r)=0

Complex Conjugate Theorem : If a+bi is a zero of a function then $a - bi$ is also a zero.

Integral Zero theorem: If the coefficients of a polynomial function are integers such that $a_0 = 1, and\ a_n = 0$, any rational zeros of the function must be factors of a_n.

Rational Zero Theorem: If P(x) is a polynomial function with integral coefficients, then every rational zero of P(x) = 0 of the form $\frac{p}{q}$, a rational number in simplest form, where p is a factor of the constant term and q is a factor of the leading coefficient.

Chapter 3.1

1) Determine whether each expression is a polynomial. If it is a polynomial, state the degree of the polynomial.

a) $3x^4 + 5x - 6$ b) $\frac{x}{y} - 3$ c) $5x^{-3} + 7x - 11$

2) Simplify each expression:

a) $(\ 2x^2 - 3x - 5\ ) - (\ 5x^2 - 7x + 8\ )$

b) $(a+b)\,(a^2-ab^2+1)$

c) $\frac{15\,x^5 \quad y^4}{3\;x^3\;\;y}$

d) $(3n-2)^3$

3) If $3^{k+3} = 9^{2k-5}$, What is the value of K ?

Chapter: 3.2

4) Simplify $\frac{6\,x^3y-3\,x\,y^2+x^4\,y^4}{xy}$

5) Use Synthetic division to find $(x^3+4x^2-11x-30) \div (x-3)$

6) Simplify: $(2x^3 - 5x^2 - 28x + 15)(x + 3)^{-1}$

Chapter: 3.3

7) State the degree and leading coefficients of the polynomials:

a) $9x^5 - 4x^3 - 5x - 11$ b) $-y^4 - 3y^3 - 2y + 8$

8) Find $P(-2)$ and $P(3)$ for the function: $P(x) = x^3 - 2x^2 - 3x + 5$.

9) If $c(x) = x^2 - 3x + 5$ *and* $d(x) = 5x - 2$

Find the value of $c(3a)$, $d(x+2)$ *and* $c(x+3)$.

10) State the degree and describe the end behavior of the function:

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

Chapter: 3.4

11) Graph the polynomial functions by making a table of values.

Determine the consecutive integer values of x between which each real zero is located.

Estimate the X-coordinates at which the relative maxima and minima occur.

a) $h(x) = x^3 - 4x^2 - 7x + 10$

b) $f(x) = x^3 - 3x^2 - 4x + 12$

12) Sketch the graph of polynomial functions with the following characteristics.

a) An odd function with zeros at $-4, -2, 0, 2, 4$

b) An even function with zeros at $1, -2, 3\ and\ 5$.

Chapter 3.5

13) Factor completely. If the polynomial is not factorable, write Prime.

a. $12ax^2 - 20cy^2 - 18bx^2 - 10ay^2 + 15by^2 + 24cx\text{^}2$

b. $x^{3y^2} - 8x^{3y} + 16x^3 + y^5 - 8y^4 + 16y^3$

14) Solve the equations:

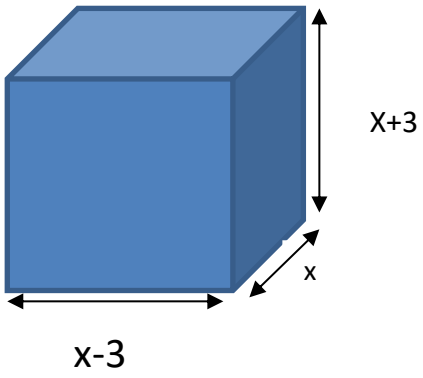
a. $x^3 + 216 = 0$

b. $x^4 + 6x^2 - 91 = 0$

c. $16x^{10} + 2x^5 + 6 = 0$

d. $4x^4 - 5x^2 - 6 = 0$

15) The volume of the figure at the right is 440 cubic Centimeters. find the value of x and the length, height and width.



Chapter 3.6

16) Use synthetic substitution to find $f(-5) and\ f(2)$

a. $f(x) = x^6 - 4x^4 + 3x^2 - 10$

b. $f(x) = 3x^4 + x^3 - 2x^2 + x + 12$

17) Find the remaining factors of the polynomial

a. $x^4 + 2x^3 + 2x^2 - 2x - 3; x - 1$

18) A motor boat traveling against waves accelerates from position. Suppose the speed of the boat in meters per second is given by the function

$f(t) = -0.04t^4 + 0.8t^3 + 0.5t^2 - t$, where t is the time in seconds.

a. Find the speed of the boat to travel at 1, 2, and 3 seconds.

b. It takes 6 seconds for the boat to travel between two buoys while it is accelerating. Use synthetic substitution to find $f(6)$ and explain what this means.

19) Find value of k so that remainder is 3 for $(x^2 - x + k) \div (x - 1)$

Chapter 3.7

20) Solve each equation. State the number and type of roots.

a. $x^5 - 8x^3 + 16x = 0$

b. $16x^4 - 81 = 0$

21) State the possible number of positive real zeros, negative real zeros, and imaginary zeros of function$-x^5 + 14x^3 + 18x - 36 = 0$

22) Find all zeros of the function $f(x) = x^4 + 6x^3 + 73x^2 + 384x + 576$

23). Write a polynomial function of least degree with integral coefficients that have the zeros -2, -3, 4-3i

24) A computer manufacturer determines that the profit for producing x computers per day is $P(x) = -0.006x^4 + 0.15x^3 - 0.05x^2 - 1.8x$

a. how many positive real zeros, negative real zeros, and imaginary zeros exist?

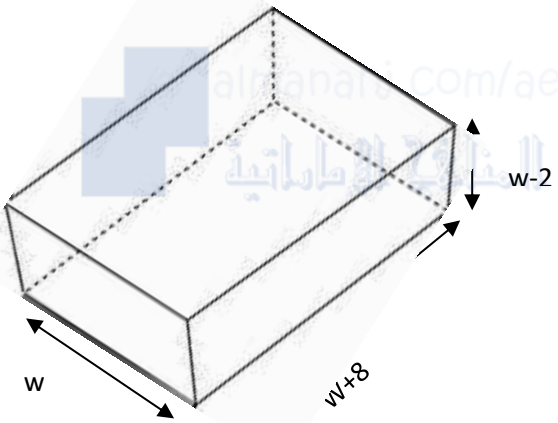
b. What is the meaning of the zeros in this situation?

Chapter 3.8

25) Find all the rational zeros of the function $f(x) = 2x^4 + 11x^3 + 26x^2 + 29x + 12$

26) Find all the zeroes of function $f(x) = 8x^3 + 14x^2 + 11x + 3$

27) Hiyam is building a storage box that is shaped like a rectangular prism. It will have a volume of 96 cubic meters. Using the diagram below, find the dimensions of the box.



Student Name: _____ Class: _____

Revision Worksheet

Grade 10 Advanced Mathematics (2019-2020)

Chapter 4: Inverses and Radical functions and relations

Instructions: *Read all questions carefully. Answer all questions*

Chapter:4, 4.1

1. **If $f(x) = x - 1$ and g(x) = $5x - 2$ then Find**

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

   c) $(f - g)(x)$

   b) $(f \cdot g)(x)$

   d) $\left(\frac{f}{g}\right)(x)$

2) Find $f\ o\ g$ and gof

a) If $f = \{(-8,-4),(0,4),(2,6),(-6,-2)$

$g = \{(-4,-4),(-2,-1),(-4,0),(6,-5)\}$

b) $f = \{(-7,0),(4,5),(8,12),(-3,6)\}$

$g = \{(6,8),(-12,-5),(0,5),(5,1)\}$

3) $If\ f(x) = x^2$, $g(x) = -x + 1$ **then find**

a) $f\ o\ g(x)$

b) $g\ of\ (x)$

$c)\ f(g(-2))$

$d)\ f(g(3a))$

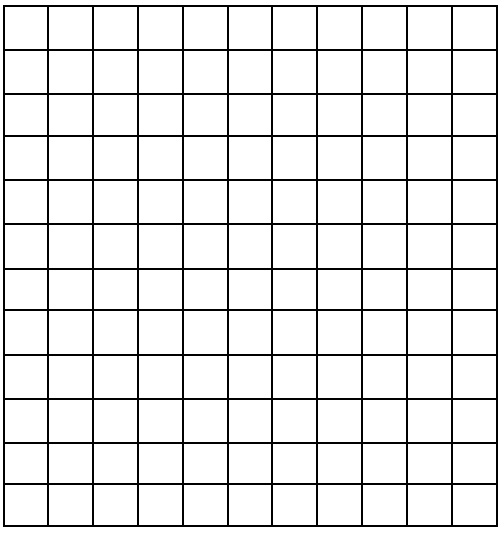
4.2

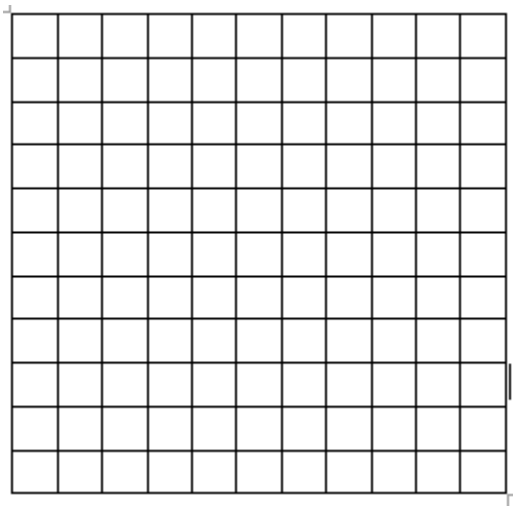
1) Find the inverse relation. $\{(-7, 0), (4, 5), (8, 12), (-3, 6)\}$

2) Find the inverse function. Then graph the function and its inverse function.

a) $f(x) = -\frac{5}{3}x - 8$

b) f(x) = $x^2 - 3$





3) Determine whether each pair of functions are inverse functions. Write yes or no

a) $f(x) = \frac{1}{2}x + 5$

$g(x) = 2x - 10$

b) $f(x) = 3x + 2$

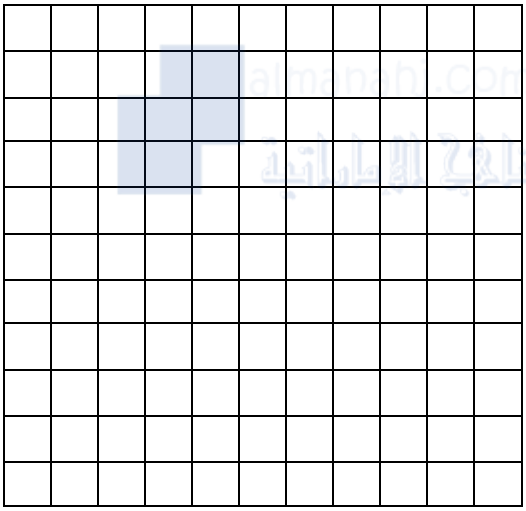
$g(x) = x^2 - 2$

4.3

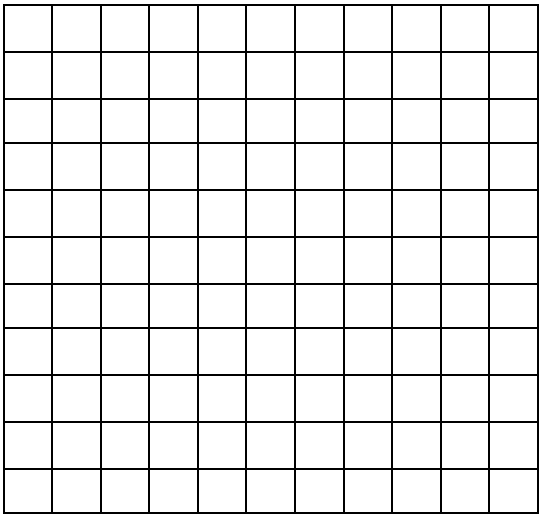
1) Identify domain and range of f(x) = $\sqrt{x+6}$ **+ 2**

2) Graph the function. State domain and range of a function.

$f(x) = 3 \cdot \sqrt{x-1}$



3) Graph the inequality $f(x) > \sqrt{2x-1} - 3$



4.4 N^{th} $Roots$

1) Simplify

a) $\pm\sqrt{121\,x^4y^{16}}$

b) $-\sqrt{(x^2+16)^{12}}$

c) $\sqrt[3]{8a^6b^{12}}$

d) $\sqrt[4]{256\,(5x-12)^{12}}$

e) $\sqrt{-64y^8Z^6}$

f)) $\sqrt[7]{(x-12)^{63}}$

2) Use a calculator to approximate each value to three decimal places.

a) $\sqrt{92}$

b) $\sqrt[6]{(8912)^2}$

3)

The surface area of a sphere can be determined from the volume of the sphere using the formula $S = \sqrt[3]{36\pi V^2}$, where V is the volume. Determine the surface area of a sphere with a volume of 200 cubic centimeters.

4.5 Operations with radical expressions

1. Simplify

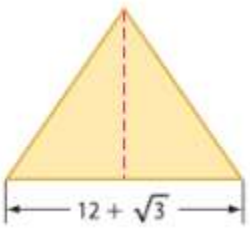
a) $\sqrt{144x^7\,y^5}$ **b)** $\frac{\sqrt{c^9}}{\sqrt{d^9}}$ **c)** $\sqrt[4]{\frac{5x}{8y}}$

d) $5 \cdot \sqrt{2x} \cdot 3\sqrt{8x}$ **d)** $3 \cdot \sqrt[3]{36xy} \cdot 2\sqrt[3]{6x^2y^2}$ **e)** $\left(4 + 2\sqrt{5}\right)\left(3\sqrt{3} + 4\sqrt{5}\right)$

f) $\frac{5}{\sqrt{2}+3}$ g) $4\sqrt{40} - \sqrt{200}$ h) $\frac{x+1}{\sqrt{x}-1}$

3)

GEOMETRY Find the altitude of the triangle if the area is $189 + 4\sqrt{3}$ square centimeters.



4.6 Rational Exponents

Write each expression in radical form, or write each radical in exponential form.

1. $10^{\frac{1}{4}}$ **2.** $x^{\frac{3}{5}}$ **3.** $\sqrt[3]{15}$ **4.** $\sqrt[4]{7x^6y^9}$

2) Evaluate each expression

a) $81^{-\frac{1}{4}}$ **b)** $256^{\frac{1}{4}}$

3) Simplify

$a^{\frac{3}{4}} \cdot a^{\frac{1}{2}}$	$\frac{x^{\frac{4}{5}}}{x^{\frac{1}{5}}}$	$\frac{b^3}{c^{\frac{1}{2}}} \cdot \frac{c}{b^{\frac{1}{3}}}$	$\sqrt[4]{9g^2}$	$\frac{g^{\frac{1}{2}} - 1}{g^{\frac{1}{2}} + 1}$

4) Find the radius **r** of the sphere with Volume **V** is given by $\boldsymbol{r = (\frac{3v}{4\pi})^{\frac{1}{3}}}$**.** Find the radius of a ball with a volume of $77cm^3$

4.7 Solving Radical equations and inequalities.

1) Solve the following equations:

a) $\boldsymbol{\sqrt{2x+5} - 4 = 3}$

b) $\boldsymbol{(4y)^{\frac{1}{3}} + 3 = 5}$

c) $\boldsymbol{(2y+6)^{\frac{1}{4}} - 2 = 0}$

d) $\boldsymbol{\sqrt{x-3} = \sqrt{x+4} - 1}$

e) $\boldsymbol{\sqrt[3]{n+8} - 6 = -3}$

f) $\boldsymbol{\sqrt{2t-7} = \sqrt{t+2}}$

2) Solve each inequality

a) $\sqrt{3x+4}-5 \leq 4$ **b)** $2+\sqrt{4y-4} \leq 6$ **c) -2 +** $\sqrt{9-5x} \geq 6$