**Algebra 2 Honors Midterm Review Guide**

To prepare for your midterm exam, please follow these suggested steps. The more practice you do, the better prepared you will be for the exam. Be sure to have your **calculator** ready the day of the exam with WORKING batteries, a **straightedge**, and more than one sharpened **pencil**. Do not expect to borrow materials.

1. Review **key vocabulary** terms at the beginning of each chapter or use the list at the end of the chapter in the review.
2. Read the **chapter** **summary** at the end of each chapter several times. Write down any ideas that are unclear.

1. Review the **quizzes** and **tests** you have already taken and be sure that you would get 100% if you took the same test today.
2. Complete the **chapter review** and **chapter test** practice at the end of each chapter.
3. For additional practice on areas you may use previous homework assignments. Your homework should be a solution key to check your work.

Use the following guiding questions to also help you prepare for the midterm.

# Algebra Review

# Equations and Inequalities

# Apply Properties of Real Numbers

# Evaluate and Simplify Algebraic Expressions

# Solve Linear Equations

# Rewrite Formulas and Equations (Literal Equations)

# Use Problem Solving Strategies and Models

# Solve Linear Inequalities

# Solve Absolute Value Equations and Inequalities

Simplify:

1) 2(-1 + 3) - 42÷8 2) 2(3 + 18÷9) - 7

Evaluate:

3) 2t3 - 4t + 3 when t = 2 4) 43x - 3y + 2 for x=5, y = -3

Solve:

5) 3(5 - a) = -4(a - 4) 6) 15(x - 2) = -13(x + 1) + 11

7) A = P + Prt for t 8) S = L - rL for L

9) V = πr2h for h 10) **|** 5r - 8 **|** = 2

11) **|** 3x + 2 **|** = 13

Solve and graph:

12) 5x - 2 < 13 13) -2x - 1 ≥ 5

#  Linear Equations and Functions

# Represent Relations and Functions

# Find Slope and Rate of Change

# Graph and Write Equations of Lines

# Model Direction, Inverse, and Joint Variation

# Draw Scatter Plots and Best-Fitting Lines

# Use Absolute Value Functions and Transformations

# Graph Linear Inequalities in Two Variables

**Problem Set**

Find the x- and y-intercepts for:

1) -3x + 4y = -2 2) 2x + 3y – 12 = 0

3) Write the equation of the line with slope of  and a y-intercept of 4.

4) Write the equation of the line that goes through the points (-6, -1) and (3, 2).

5) Write the equation of the line that goes through the points (4, 3) and (0, -5)

6) Write the equation of the horizontal line through the point (3, -7).

7) Write the equation of the vertical line through the point (-2, -4).



Graph:

8) 2x + 3y = 6 9) 5x - 2y = -4



10) 5x + 3y < 6 11) 6x – 2y ≥ 8

Graph and analyze the following scatter plot.

The manager of a band has kept track of the price of tickets and the attendance at the band’s recent concerts.

|  |
| --- |
| Concert Attendance by Ticket Sales |
| Price ($) | 6 | 5 | 8.5 | 8 | 10 | 5.5 | 7 | 7.5 | 8 |
| Attendance | 213 | 256 | 155 | 194 | 160 | 267 | 258 | 210 | 235 |

16) Make a scatter plot of the data using price as the independent variable on your calculator.

17) Find the equation of the line of best fit on your calculator.

18) Using the equation above, predict the attendance at a concert where the price of tickets is $9. Show calculations.

Graph the function.

19)  20) f(x) = 



22) In 1990 Marc earned $42,360 per year, and he now earns $61,800. What is the rate of change for Marc’s salary per year?

#  Linear Systems

# Solve Linear Systems by Graphing

# Solve Linear Systems Algebraically

# Graph Systems of Linear Inequalities

**Problem Set**

Solve the system:

1)  2) 

3) Draw an example of a system that is inconsistent. Explain how you know that it is inconsistent.

Graph:

4)  5) 

Solve by writing a system of equations.

6) A park ranger at Creekside Woods estimates there are 6000 deer in the park. She also estimates that the population will increase by 75 deer each year to come. Write an equation that represents how many deer will be in the park in x years.

7) Graph the system of inequalities 

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# Quadratic Functions and Factoring

# Graph Quadratic Functions in Standard Form

# Graph Quadratic Functions in Vertex or Intercept Form

# Perform Operations with Complex Numbers

# Solve x2 + bx + c = 0 by Factoring

# Solve ax2 + bx + c = 0 by Factoring

# Solve Quadratic Equations by Finding Square Roots

# Complete the Square

# Use the Quadratic Formula and the Discriminant

**Problem Set**

What is standard form of a quadratic function? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

The graph of a quadratic is a \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is the formula for the axis of symmetry? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is vertex form of a quadratic function? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is intercept form a quadratic function? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

When a quadratic function is in intercept form how do you find the axis of symmetry? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is the quadratic formula? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

What is the discriminate? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

For the given function

y= 3x2 – 6x + 4

1. Determine if the quadratic function opens up or down. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
2. Find the axis of symmetry. \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
3. Find the vertex.\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_
4. Graph the function. Label the vertex and axis of symmetry.

Graph:

y= 3x2

Factor:

1) x2 - 7x + 6 2) 16x2 – 1

3) 18x2 + 36x +16 4) 7x2 – 10 = 25

5) 9p2 – 12p + 4 6) 4x2 + 12x + 9

7) x2 - 81 8) x2 – 7x +10

9) p2 + 2p + 4 10) x2 – 7x - 18

Solve:

11) 3x2 - 24 = 0 12) 5x2 + 19x = 125 + 19x

13) x2 - 10x - 4 = 0 14) -2x2 + 3x -7 = -9

15) x2 + 5x + 7 = 0 16) 2x2 - 2x = -3

For each of the following, find: the vertex, axis of symmetry, y-intercept, and x-intercepts. Then graph the function.

17) y = x2 - 4x + 3 18) y = 2x2 - x – 6

(Complete the square to put into

Vertex form for this one)

Simplify:

19) $\sqrt{121}$ 20) $\sqrt{81}$

21) $\sqrt{54}$ 22) $\sqrt{\frac{4}{25}}$

23) $\sqrt{\frac{25}{240}}$ 24)$ \frac{2}{5+\sqrt{3}}$

25) $\frac{8}{1-\sqrt{10}}$ 26) $\frac{\sqrt{2}}{4+\sqrt{5}}$

27) $\frac{3+\sqrt{7}}{2-\sqrt{10}}$ 28)$\sqrt{3} ∙\sqrt{27}$

29) $4\sqrt{5}∙\sqrt{5}$ 30) $\sqrt{\frac{18}{11}}$

31)  32)  + 

33) ***i15*** 34) (3***i***)(2***i***)

35) (2 + 3***i***) + (5 - 4***i***) 36) (2 + 3***i***) - (5 - 4***i***)

37) (2 + 3***i***)(5 - 4***i***) 38) 

39) (3***i***)5 40) (4 -5***i***)2

Graph the function. Label the vertex and the axis of symmetry.

41) f(x) = -x2 – 2x – 1

Tell whether the function has a minimum value or a maximum value. Then find the minimum or maximum value.

42) y= -6x2 – 1 43) f(x)=2x2 + 8x + 7

What is the vertex of the graph of the function.

44) y= 3(x + 2)2 – 5 45) y= -(x – 6)(x + 4)

Write the function in standard form.

46) y = (x +2)( x – 6) 47) 5(x + 3)2 – 4

48) Find the value of x

 Area of rectangle = 36

x

x + 5

 Find the value of c that makes the expression a perfect square trinomial. Then write the expression as the square of a binomial.

49) x2 +6x +c 50) x2 + 50x + c

Solve the equation by completing the square.

51) 3x2 + 42x = -24 51) x2 + 8x = -1

52) What is the quadratic formula? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

53) What is the discriminant? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Use the quadratic formula to solve the equation.

54) 3w2 – 12w = - 12 55) 7x – 5x + 12x2 = -3x

Find the discriminant of the quadratic equation and give the number and type of solutions of the equation.

56) 5x2 + 20x + 21 =0 57) x2 – 8x +16 =0

58) what is the value of c if the discriminant of 2x2 + 5x + c =0 is -23?

Mixed Review:

 59) Which relation is a function?

|  |  |  |  |
| --- | --- | --- | --- |
|  a. |  | b. |  |

 60)

 Determine the type and number of solutions for 

|  |  |  |  |
| --- | --- | --- | --- |
|  a. | Two real solutions | c. | One real solution |
|  b. | Two imaginary solutions | d. | One imaginary solution. |

 61) Determine which binomial is a factor of .

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
|  a. | *x* + 16 | b. | *x* – 4 | c. | *x* – 16 | d. | *x* + 4 |

62) **Simplify by combining like terms.**

 **

 63) Find the slope of the line through the pair of points (2, 1) and (9, 7)

 64) Find the point-slope form of the equation of the line passing through the points (–7, –5) and (6, 5).

 65) Find the slope of the line for the equation 

 66) Find the equation of the line that passes through (4, 5) and is parallel to *y* = *x* – 1.

 67) Find the equation of the line that passes through (–4, –7) and is perpendicular to *y* = *x* – 4.

 68) Write an equation in slope-intercept form for the line that satisfies the following condition.

slope 9, and passes through (7, 21)