

Name \_\_\_\_\_

# *Math Analysis Honors*

## Summer Review Packet

**DUE THE FIRST DAY OF SCHOOL**

**DO ALL PROBLEMS WITHOUT A CALCULATOR.**

Show all of your work.

You must do all work **without help from another person.**

**NO TUTORS!!!**

**ALL** work should be completed and ready to turn in on the **FIRST DAY** of school. This packet will count as part of your first quarter grade.

I verify that I have completed this packet without the help of any other person:

\_\_\_\_\_  
Signature

\_\_\_\_\_  
Date

Name \_\_\_\_\_

**SHOW ALL WORK.**

I. Simplify. Show the work that leads to your answer.

1.  $\frac{x-4}{x^2-3x-4}$

2.  $\frac{x^3-8}{x-2}$

3.  $\frac{5-x}{x^2-25}$

4.  $\frac{x^2-4x-32}{x^2-16}$

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II. Complete the following identities.

1.  $\sin^2x + \cos^2x =$  \_\_\_\_\_

2.  $1 + \tan^2x =$  \_\_\_\_\_

3.  $\cot^2x + 1 =$  \_\_\_\_\_

4.  $\cos 2x =$  \_\_\_\_\_

5.  $\sin 2x =$  \_\_\_\_\_

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III. Simplify each expression.

1.  $\frac{1}{x+h} - \frac{1}{x}$

2.  $\frac{\frac{2}{x^2}}{\frac{10}{x^5}}$

3.  $\frac{\frac{1}{3+x} - \frac{1}{3}}{x}$

4.  $\frac{2x}{x^2-6x+9} - \frac{1}{x+1} - \frac{8}{x^2-2x-3}$

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IV. Solve for z:

1.  $4x + 10yz = 0$

2.  $y^2 + 3yz - 8z - 4x = 0$

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V. If  $f(x) = \{(3,5), (2,4), (1,7)\}$

$g(x) = \sqrt{x-3}$

$h(x) = \{(3,2), (4,3), (1,6)\}$

$k(x) = x^2 + 5$

determine each of the following:

1.  $(f + h)(1) =$  \_\_\_\_\_

2.  $(k - g)(5) =$  \_\_\_\_\_

3.  $(f \circ h)(3) =$  \_\_\_\_\_

4.  $(g \circ k)(7) =$  \_\_\_\_\_

5.  $f^{-1}(x) =$  \_\_\_\_\_

6.  $k^{-1}(x) =$  \_\_\_\_\_

7.  $\frac{1}{f(x)} =$  \_\_\_\_\_

8.  $(kg)(x) =$  \_\_\_\_\_

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VI. Miscellaneous: Follow the directions for each problem.

1. Evaluate  $\frac{f(x+h) - f(x)}{h}$  and simplify if  $f(x) = x^2 - 2x$ .

2. Expand  $(x + y)^3$

3. Simplify:  $x^{\frac{3}{2}}(x + x^{\frac{5}{2}} - x^2)$

4.

Factor and simplify. Express the answer as a fraction without negative exponents.

$$3x(2x + 5)^{-1/2} + 3(2x + 5)^{1/2}$$

VII. Expand and simplify

1.  $\sum_{n=0}^4 \frac{n^2}{2}$

2.  $\sum_{n=1}^3 \frac{1}{n^3}$

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VIII. Simplify

1.  $\frac{\sqrt{x}}{x}$  \_\_\_\_\_

2.  $e^{\ln 3}$  \_\_\_\_\_

3.  $e^{(1+\ln x)}$  \_\_\_\_\_

4.  $\ln 1$  \_\_\_\_\_

5.  $\ln e^7$  \_\_\_\_\_

6.  $\log_3(1/3)$  \_\_\_\_\_

7.  $\log_{1/2} 8$  \_\_\_\_\_

8.  $\ln \frac{1}{2}$  \_\_\_\_\_

9.  $e^{3 \ln x}$  \_\_\_\_\_

10.  $\frac{4xy^{-2}}{12x^{-\frac{1}{3}}y^{-5}}$  \_\_\_\_\_

11.  $27^{2/3}$  \_\_\_\_\_

12.  $(5a^{2/3})(4a^{3/2})$  \_\_\_\_\_

13.  $(4a^{5/3})^{3/2}$  \_\_\_\_\_

14.  $\frac{3(n+1)!}{5n!}$  \_\_\_\_\_

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IX. Using the point-slope form  $y - y_1 = m(x - x_1)$ , write an equation for the line

1. with slope  $-2$ , containing the point  $(3, 4)$       1. \_\_\_\_\_

2. containing the points  $(1, -3)$  and  $(-5, 2)$       2. \_\_\_\_\_

3. with slope  $0$ , containing the point  $(4, 2)$       3. \_\_\_\_\_

4. perpendicular to the line in problem #1, containing the point  $(3, 4)$       4. \_\_\_\_\_

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X. Solve for  $p$ .

$$hp - 1 = q + kp + 6p$$

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XI. **Without** a calculator, determine the exact value of each expression.

1.  $\sin 0$  \_\_\_\_\_      2.  $\sin \frac{\pi}{2}$  \_\_\_\_\_      3.  $\sin \frac{3\pi}{4}$  \_\_\_\_\_

4.  $\cos \pi$  \_\_\_\_\_      5.  $\cos \frac{3\pi}{4}$  \_\_\_\_\_      6.  $\cos \frac{\pi}{3}$  \_\_\_\_\_

7.  $\tan \frac{7\pi}{4}$  \_\_\_\_\_      8.  $\tan \frac{\pi}{6}$  \_\_\_\_\_      9.  $\tan \frac{2\pi}{3}$  \_\_\_\_\_

10.  $\cos(\sin^{-1} \frac{1}{2})$  \_\_\_\_\_      11.  $\sin^{-1}(\sin \frac{7\pi}{6})$  \_\_\_\_\_

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XII. For each function, determine its domain and range.

Function	Domain	Range
1. $y = \sqrt{x-4}$	_____	_____
2. $y = \sqrt{x^2-4}$	_____	_____
3. $y = \sqrt{4-x^2}$	_____	_____
4. $y = \sqrt{x^2+4}$	_____	_____

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XIII. Determine all points of intersection.

1. parabola  $y = x^2 + 3x - 4$  and  
line  $y = 5x + 11$

2.  $y = \cos x$  and  $y = \sin x$  in the  
first quadrant

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XIV. Solve for  $x$ , where  $x$  is a real number. Show the work that leads to your solution.

1.  $x^2 + 3x - 4 = 14$

2.  $\frac{x^4-1}{x^3} = 0$

3.  $(x-5)^2 = 9$

4.  $2x^2 + 5x = 8$

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Solve for  $x$ , where  $x$  is a real number. Show the work that leads to your solution.

5.  $(x + 3)(x - 3) > 0$

6.  $x^2 - 2x - 15 \leq 0$

7.  $12x^2 = 3x$

8.  $\sin 2x = \sin x, 0 \leq x \leq 2\pi$

9.  $|x - 3| < 7$

10.  $(x + 1)^2(x - 2) + (x + 1)(x - 2)^2 = 0$

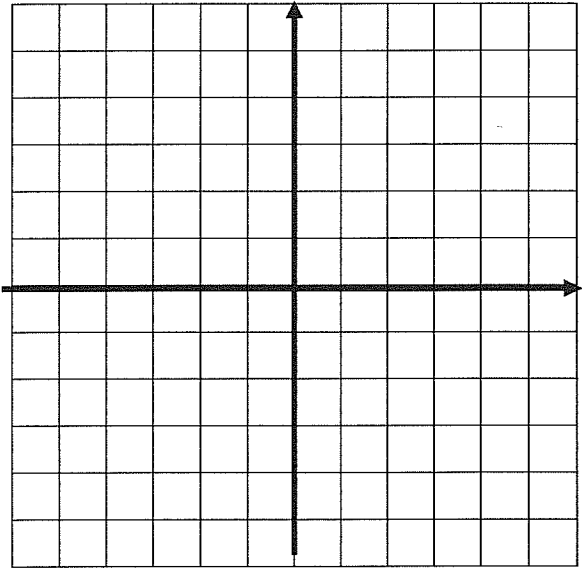
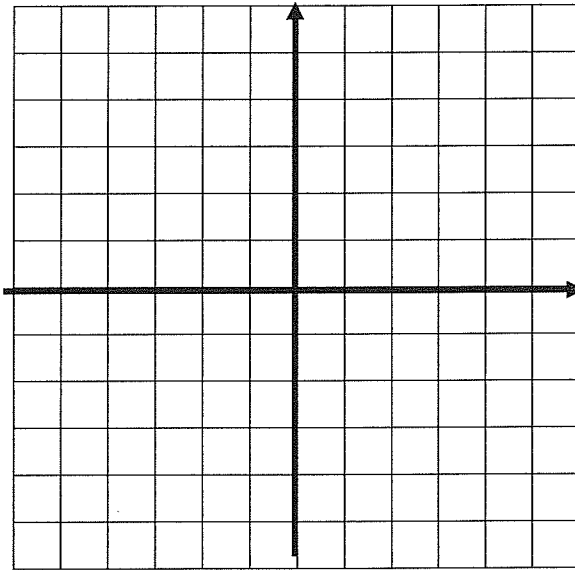
11.  $27^{2x} = 9^{x-3}$

12.  $\log x + \log(x - 3) = 1$

XV. Graph each function. Give its domain and range.

1.  $y = \sin x$

2.  $y = e^x$



Domain \_\_\_\_\_

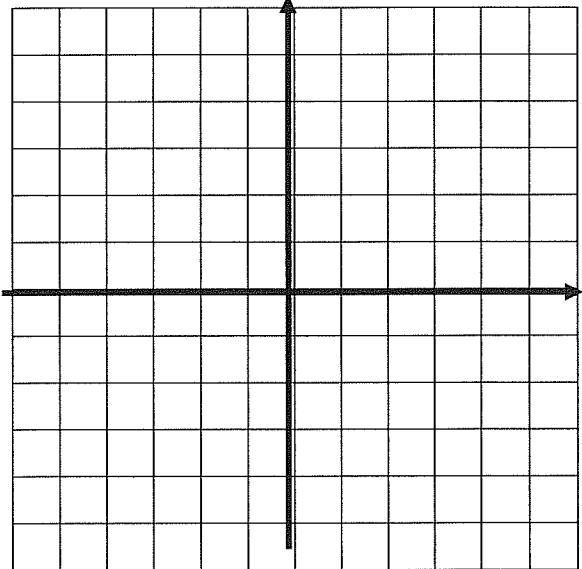
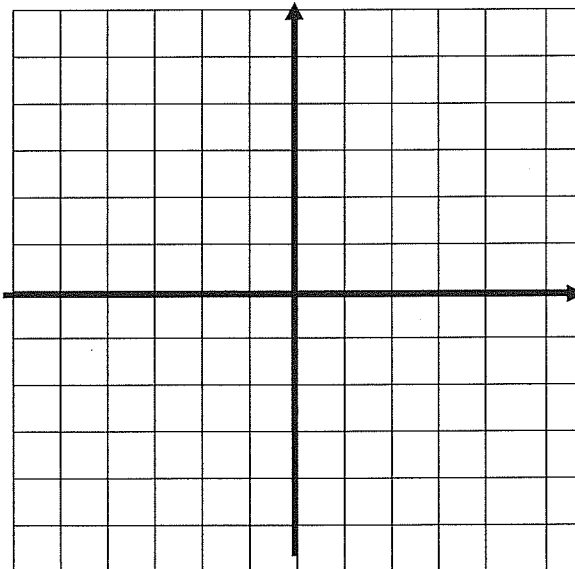
Domain \_\_\_\_\_

Range \_\_\_\_\_

Range \_\_\_\_\_

3.  $y = \sqrt{x}$

4.  $y = \sqrt[3]{x}$



Domain \_\_\_\_\_

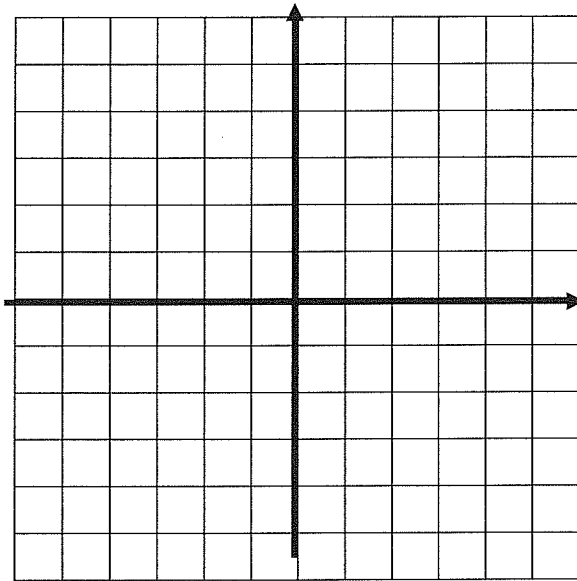
Domain \_\_\_\_\_

Range \_\_\_\_\_

Range \_\_\_\_\_

Graph each function. Give its domain and range.

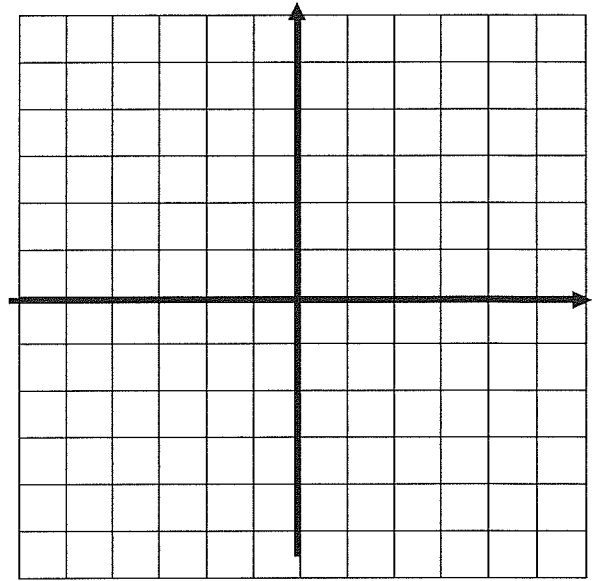
5.  $y = \ln x$



Domain \_\_\_\_\_

Range \_\_\_\_\_

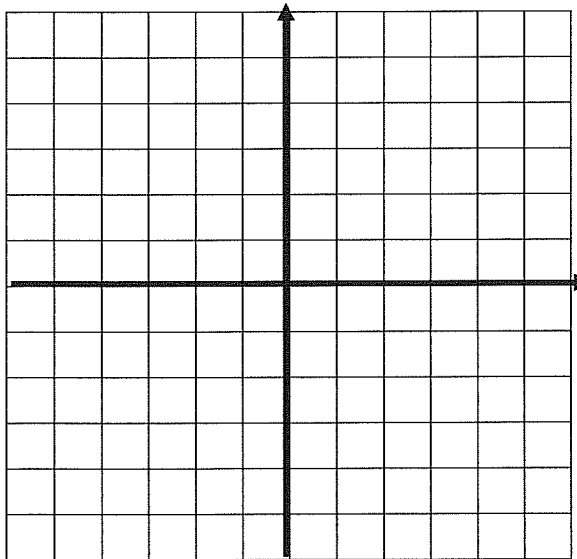
6.  $y = |x + 3| - 2$



Domain \_\_\_\_\_

Range \_\_\_\_\_

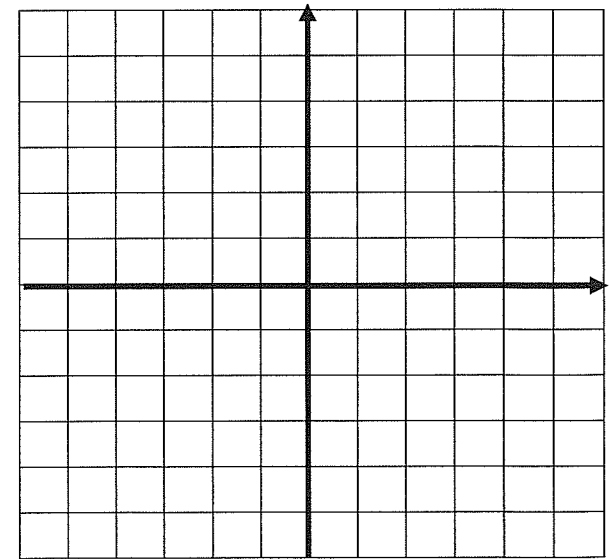
7.  $y = \frac{1}{x}$



Domain \_\_\_\_\_

Range \_\_\_\_\_

8.  $y = \begin{cases} x^2 & \text{if } x < 0 \\ x + 2 & \text{if } 0 \leq x \leq 3 \\ 4 & \text{if } x > 3 \end{cases}$



Domain \_\_\_\_\_

Range \_\_\_\_\_

## XVI

1. Solve for  $x$ .

$$\ln(e^{7x}) = 15$$

2. Solve for  $x$ .

$$\frac{e^{x+5}}{e^5} = 3$$

3. Solve for  $x$ .

$$(e^3)^{2x} = e^3 e^{2x}$$

4. Use the properties of logarithms to expand the expression.

$$\ln \frac{(4x^5 - x - 1)\sqrt{x - 7}}{(x^2 + 1)^3}$$

6. Solve for  $x$ .

$$3^{2x} - 2 \cdot 3^{(x+5)} + 3^{10} = 0$$

7. Find the  $x$ -intercept for the graph of the function.

$$f(x) = \ln x + 2$$