

SUMMER REVIEW FOR STUDENTS ENTERING HONORS PRECALCULUS

The assignment below is a review of the Algebra 2 concepts learned this year and is due on the first day of school. Show ALL work on neatly on a separate sheet of paper.

PART I: Points and Lines:

1) Given the point (2, -3) find the points that are symmetric to point (2,-3) and the

- a) x- axis
- b) y-axis
- c) the origin

2) Write the equation for the vertical and horizontal lines through the point (1,3).

In exercises #3-6, write the equation for the given line in slope-intercept form:

3) The line through the point P(2, 3) with $m = 2$

4) The line through the point P(2, 3) with slope 0

5) The line through the point P(1,0) and no slope

6) The line through the points (-2, -2) and (1, 3)

7) Find the slope-intercept form of the equation of a line through P(6,2) and parallel to the line $2x - y = -2$

8) Find the slope-intercept form of the equation of the line through P(6,2) and perpendicular to the line $2x - y = -2$

PART II: Functions and Graphing

For numbers 9 – 17, sketch the graphs from memory. Plot at least 5 points. Then state the DOMAIN and RANGE:

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

10) $y = x^3$

11) $y = \sqrt{x}$

12) $y = e^x$

13) $y = \ln x$

14) $y = \frac{1}{x}$

15) $y = \frac{1}{x - 2}$

16) $y = |x + 1|$

17) $y = \begin{cases} -x - 2, & -2 < x \leq -1 \\ -x^2, & -1 < x \leq 1 \\ x + 2, & 1 < x \leq 2 \end{cases}$

18) Given: $f(x) = \frac{1}{x}$ and $g(x) = x^2 - 4$

a) Find the domain and range of $f(x)$ and $g(x)$

b) find the equations for:

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

$$f^{-1}(x)$$

$$\frac{f(x)}{g(x)}$$

$$g(x)$$

c) Find $f(g(x))$ and $g(f(x))$

d) Find the domain and range of $f(g(x))$

PART III: Conics

19) Write the equation of the circle with center (2,1) and radius 5

20) Identify the center and radius of the circle:

$$x^2 + y^2 - 2x + 4y - 6 = 0$$

21) Write an equation for the parabola with focus (0,2) and directrix of $y = -2$

22) Find the focus and the directrix for the parabola $y = x^2 - 4x + 4$. Then graph the parabola, labeling the vertex and plotting at least 5 points.

23) Find the vertices and the foci for the ellipse. Then sketch a graph of the ellipse. Be sure to label vertices and foci on your graph.

$$\frac{x^2}{36} + \frac{y^2}{16} = 1$$

24) Determine the type of conic (ie, ellipse, hyperbola, parabola) from the equation below by rewriting the equation in standard form. *Hint: Complete the square!*

$$7x^2 - 12y^2 - 14x + 24y - 28 = 0$$

PART IV: Factoring, Simplifying and Solving Equations:

In numbers 25-27, solve the following system of equations. You may use any method as long as you show work.

$$25) \begin{cases} 8x + y = 11 \\ x - y = 97 \end{cases}$$

$$26) \begin{cases} 2x + y = 6 \\ 4x + 2y = 8 \end{cases}$$

27) Solve the following equation for x :
 $2xy = 3y$

For numbers 28-32, factor completely:

$$28) x^2 - 36$$

$$29) x^2 - 2x + 8$$

$$30) x^3 + 8x^2 - 20x$$

$$31) 3y^3 - 18y^2 - 48y$$

$$32) 5(3x - 7) + x(3x - 7)$$

For numbers 33-42, solve the equations

$$33) 3 - 2m = 3m + 1$$

$$34) \frac{1}{3}x = 2 - \frac{2}{3}x$$

$$35) x^3 - 2x^2 - 4x + 8 = 0$$

$$36) 2x^2 + 5x - 3 = 0$$

37) Solve by completing the square:
 $x^2 - 14x = 15$

$$38) \sqrt{2x+1} = \sqrt{x+6}$$

$$39) 8^{2x+3} = 4 \cdot 2^{x+1}$$

$$40) \frac{x+1}{3x-6} = \frac{5x}{6} + \frac{1}{x-2}$$

$$41) 2x^2 = x$$

$$42) \sqrt{x-5} = 2\sqrt{x}$$

In numbers 43-48, simplify the expressions:

$$43) \frac{2x^2 + 3x - 2}{x^2 + 2x - 35} \cdot \frac{x^2 - 49}{2x^2 + 5x + 2}$$

$$44) \frac{\frac{6x}{x^2 - 4}}{\frac{3x - 9}{2x + 4}}$$

$$45) \frac{3 - \sqrt{2}}{2\sqrt{3} + 5}$$

$$46) \log_3 27$$

$$47) e^{\ln 2}$$

$$48) \left(\frac{1}{625} \right)^{\frac{-3}{4}}$$