

SUMMER PREPERATION FOR PRECALCULUS W/ ANALYSIS

This worksheet is a review of the entering objectives for Precalculus with Analysis. It is due on the first day of school. It is to be done neatly, with all work shown on a separate piece of paper. Have a great summer and we look forward to seeing you next year.

In exercises 1-2, find the points that are symmetric to the given point:

- a) Across the x-axis
- b) Across the y-axis
- c) Across the origin
- d) Across the line $x = 3$.

1) (1,4) 2) (2,-3)

3) Define even function and give an example.

4) Define odd function and give an example.

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

In exercises 6-9, write the equation for the given line in slope-intercept form.

6) P(2,3); $m = 2$

7) P(2,3); $m = 0$

8) P(1,0); no slope

9) (-2,-2) and (1,3)

10) Given: P(6,0), Line: $2x - y = -2$

a) Find an equation for the line through P parallel to L.

b) Find an equation of the line through P perpendicular to L.

For numbers 11-18, sketch the graphs from memory. Plot at least 5 points.

*Then state the **Domain** and **Range**:*

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

12) $y = x^3$

13) $y = \sqrt{x}$

14) $y = e^x$

15) $y = \ln x$

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

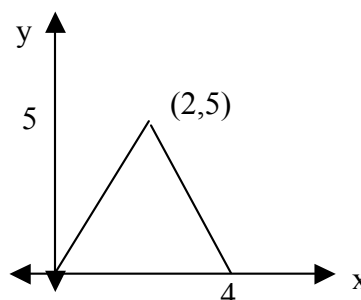
17) $y = \frac{1}{x - 2}$

18) $y = |x + 1|$

19) Graph the function:

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

20) Write a piecewise (compound) function for the graph to the below:



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

a) find the domain and range of f and g.

b) Find the equations for $f + g$, f^{-1} , f/g , $f \circ g$, $g \circ f$

c) Find the domain and range of $f \circ g$, $g \circ f$

22) Write the equation for the circle with center (2,1) and radius 5.

23) Identify the center and the radius of the circle:

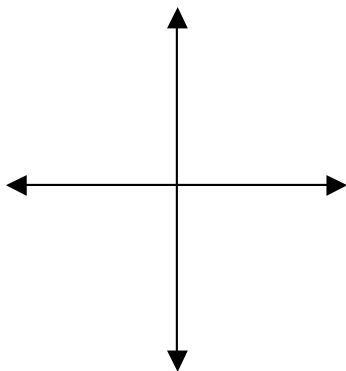
$$x^2 + y^2 - 2x + 4y - 6 = 0$$

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

25) Find the focus and directrix for the parabola $y = x^2 - 4x + 4$

26) Find the vertices, foci, eccentricity and sketch the ellipse:

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



27) Classify the conic given:

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

Solve the following systems in numbers 28 – 30.

$$28) \begin{cases} 8x + y = 11 \\ x - y = 97 \end{cases}$$

$$29) \begin{cases} 2x + y = 6 \\ 4x + 2y = 8 \end{cases}$$

$$30) \begin{cases} x + y - z = -1 \\ 4x - 3y + 2z = 16 \\ 2x - 2y - 3z = 5 \end{cases}$$

Solve and Check for numbers 31 – 35.

$$31) \sqrt{x+1} = \sqrt{x+6} - 1$$

$$32) 8^{2x+3} = 4 \cdot 2^{x+1}$$

$$33) \frac{x+1}{3x-6} = \frac{5x}{6} + \frac{1}{x-2}$$

$$34) 2x^2 = x$$

$$35) \sqrt{x-5} = 2\sqrt{x}$$

Simplify the following expressions for numbers 36-42.

$$36) \frac{x^2 + 2ax}{2a - x} \cdot \frac{x^2 - 3ax + 2a^2}{a^2 - x^2} \div \frac{x + 2a}{x + a}$$

$$37) \frac{\frac{1}{x} - \frac{1}{x+1}}{\frac{1}{x} - \frac{1}{x-1}}$$

$$38) \frac{3 - \sqrt{2}}{2\sqrt{3} + 5}$$

$$39) \sqrt{-16}\sqrt{-169}$$

$$40) \log_3 27$$

$$41) \left(\frac{1}{625}\right)^{-\frac{3}{4}}$$

$$42) e^{\ln x^2}$$

43) Which of the following has a vertical asymptote and why?

$$a) y = 2^x$$

$$b) y = \frac{2}{x-3}$$

$$c) y = \sqrt{x+1}$$

$$d) y = \frac{8x^3 - 1}{2x^2 + 5x - 3}$$

44) Solve the following equations for both x and y.

$$a) x^2 + y^2 = 0$$

$$b) 2xy = 3y$$

45) Compute the value of the discriminant ($b^2 - 4ac$) and then determine the nature of the roots of each of the following equations:

$$a) x^2 + 3x + 5 = 0$$

$$b) 4x^2 - 12x + 9 = 0$$

$$c) 3x^2 - 7x - 6 = 0$$

Factor the following expressions completely:

$$46) x^2 - 36$$

$$47) x^2 - 2x + 8$$

$$48) x^3 + 8x^2 - 20x$$

$$49) 3y^3 - 18y^2 - 48y$$

$$50) 5(3x - 7) + x(3x - 7)$$

$$51) 3x^2 + 6xy + 3y^2 + x + y = 0$$

Solve the following equations:

$$52) 3 - 2m = 3m + 1$$

$$53) \frac{1}{3}x = 2 - \frac{2}{3}x$$

$$54) x^3 - 2x^2 - 4x + 8 = 0$$

$$55) 2x^2 + 5x - 3 = 0$$

Solve each equation by completing the square (#'s 56-57):

$$56) x^2 + 10x = 11$$

$$57) x^2 - 14x = 15$$