

Name _____

PreCalculus Honors Summer Assignment

Show all work required for each problem.

1. Use long division to divide $(x^3 + 3x^2 - 36x + 23)$ by $(x + 8)$

1. _____

2. Use synthetic division to divide $(x^3 + 4x^2 + 6x + 5)$ by $(x + 2)$

2. _____

3. Solve for x by completing the square.

3. _____

$$3x^2 + 6x - 5 = 0$$

4. Simplify and write in standard form.

4. _____

$$(5i)(6 + 6i) - (5i)(-8 - 2i)$$

5. Simplify and write in standard form.

5. _____

$$\frac{2+2i}{3-2i}$$

6. Rewrite in radical form and simplify.

$$(50x^2y)^{\frac{3}{2}}$$

6. _____

7. Algebraically test $y = 2x^3 - 6x$ for symmetry with respect to the x-axis, the y-axis, and the origin.

7. _____

8. Given $f(x) = -2x^3 + 5x$ and $g(x) = x^3 + 4x^2 + 6$, determine $f(x) \cdot g(x)$ and write the domain in interval notation.

8. _____

Domain: _____

9. Given $f(x) = -2x^3 + 5x$ and $g(x) = x^3 + 4x^2 + 6x$, determine $g(x) - f(x)$ and write the domain in interval notation.

9. _____

Domain: _____

10. Given $f(x) = 2x^2 + x - 4$ and $g(x) = 3x + 3$, determine

10A. _____

A. $(f \circ g)(2)$

B. $(f \circ g)(x)$

10B. _____

11. Given $f(x) = \frac{2x^3 - 5}{7}$, determine $f^{-1}(x)$ and write the domain in interval notation.

11. _____

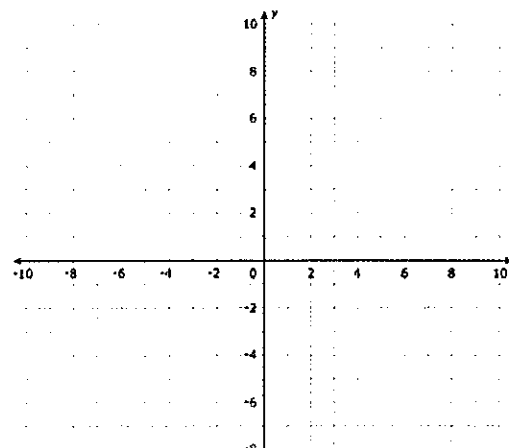
Domain: _____

12. Given $f(x) = 2x^5 + x^4 - x^3 - 20x^2 + 16x + 21$, list all the possible zeros of $f(x)$. Then choose one possible rational zero and check if it is a zero.

12. _____

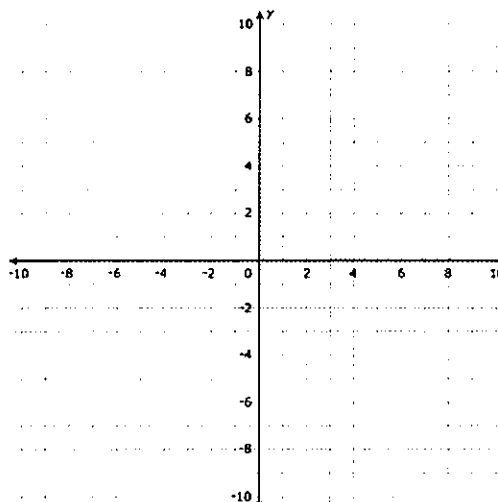
13. Given $f(x) = x^3 + 5x^2 + 11x + 15$, sketch a complete graph and determine all the zeros to two decimal places.

13. _____



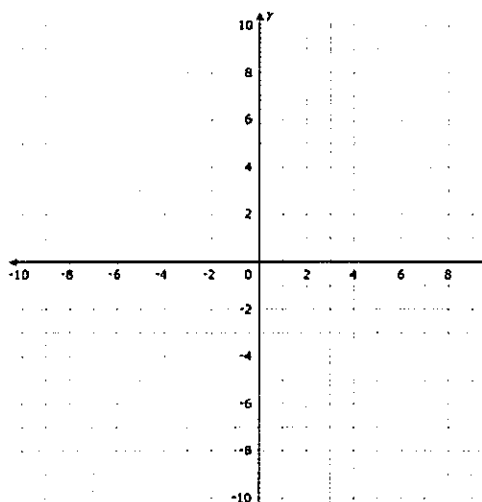
14. Given $f(x) = -x^4 - x^3 + 3x^2 - 1$, sketch a complete graph, determine the coordinates of the relative maximums and minimums, and write the interval of x for which the function is increasing, decreasing, and constant in interval notation.

14. _____



15. Sketch a graph of $f(x) = 4^x + 3$. Draw and label the asymptote. State the domain and range of the function in interval notation and write the end behavior statements.

15. _____



16. Solve for x. Round your answer to two decimal places.

16. _____

$$12^{x-2} + 6 = 22$$

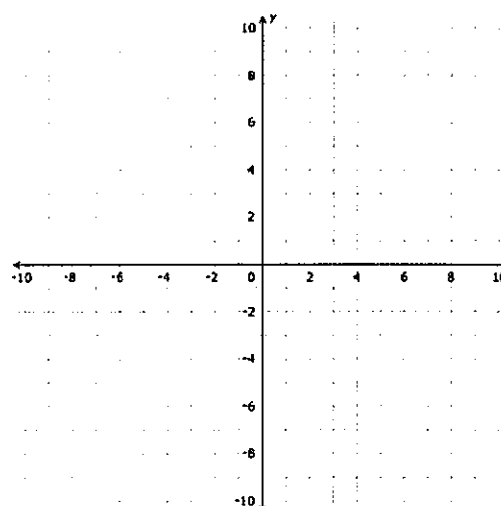
17. Algebraically solve for x. Round your answer to two decimal places.

17. _____

$$-3(e^x) + 6 = -69$$

18. Sketch a graph of $f(x) = \log(x+3)$. Draw and label the asymptote. State the domain and range of the function in interval notation and write the end behavior statements.

18. _____



19. Use the properties of logarithms to expand $\log_7\left(\frac{x^2y}{z^4}\right)^3$

19. _____

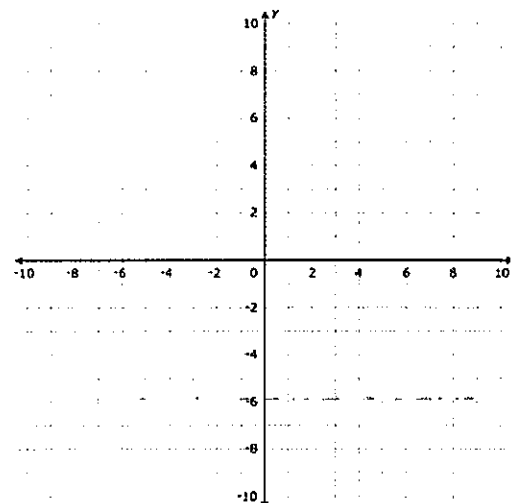
20. Solve for x. Round your answer to two decimal places.

20. _____

$$\log_4(3x - 10) = 2$$

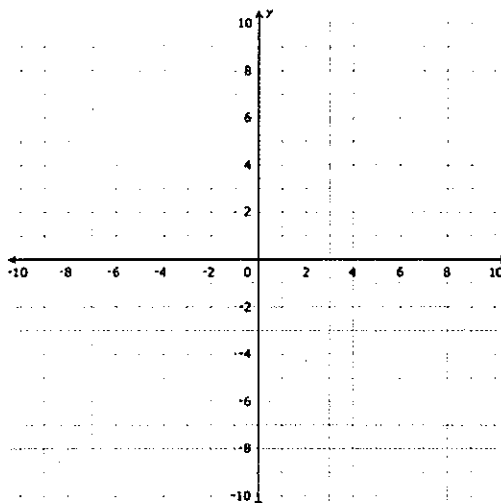
21. Sketch a graph of $f(x) = \frac{2x^2}{x^2 - 2x - 3}$. Draw and label all asymptotes. State the domain of the function in interval notation, give coordinates of the y-intercept and x-intercepts (if they exist), and write the end behavior statements.

21. _____



22. Sketch a graph of $f(x) = \frac{9+x^2}{1+x}$. Draw and label all asymptotes. State the domain of the function in interval notation, give coordinates of the y-intercept and x-intercepts (if they exist), and write the end behavior statements.

22. _____



23. Algebraically solve for the zeros of $f(x) = x^4 - 9$. Then write the linear factorization of $f(x)$.

23. _____

24. Algebraically solve for the zeros of $f(x) = 3x^3 - 9x^2 + x - 3$. Then write the linear factorization of $f(x)$.

24. _____

25. Given $f(x) = x^5 + 2x^4 + x^3 - 8x^2 - 16x - 8$, find all the zeros and write the linear factorization of $f(x)$.

25. _____

26. Graph the following piecewise relation on the given grid. Explain whether it is a function or not. Then evaluate the relation at each specified value of x .

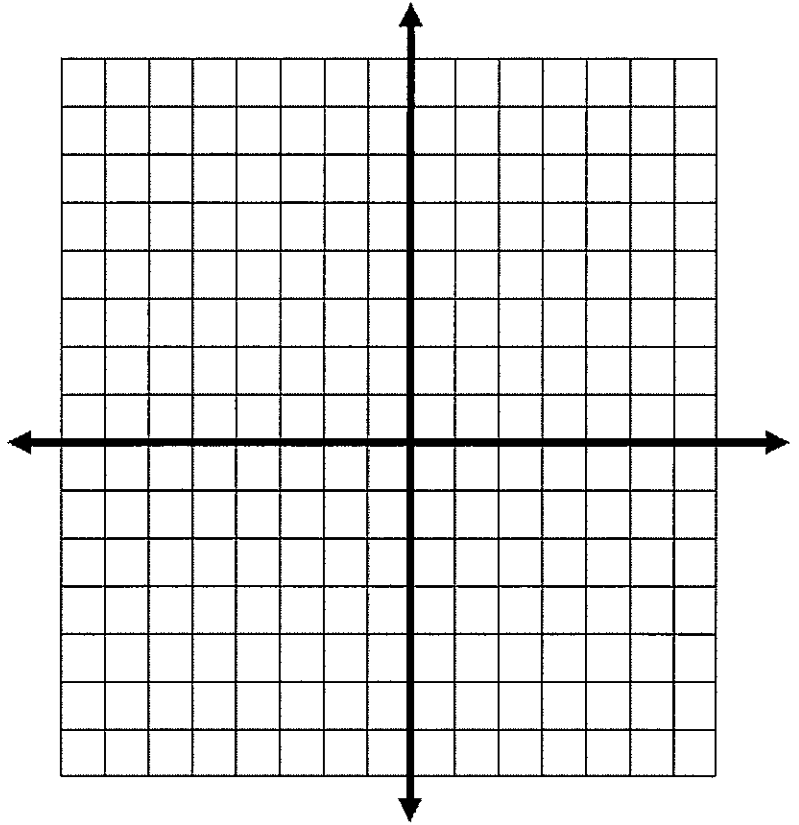
$$y = \begin{cases} x + 5 & x < -2 \\ x^2 + 2x + 3 & x \geq -2 \end{cases}$$

Function? Yes or No

$$x = 3$$

$$x = -2$$

$$x = -4$$



27. Given the graph of $g(x)$, answer the following.

Domain in interval notation.

Range in interval notation.

$$g(-4) =$$

$$g(-3) =$$

$$g(1) \approx$$

