Cumulative Test

Chapters 7–12

Name _____

Date _____

1. Simplify. $\dfrac{4^{-2}x^3y^{-3}}{2^3(xy^{-2})^2} \cdot \dfrac{(x^3y^3)^{-1}}{(8x)^{-3}}$ **1.** _____

2. Solve for x. $3^{-2} \cdot 9^x = 27^2$ **2.** _____

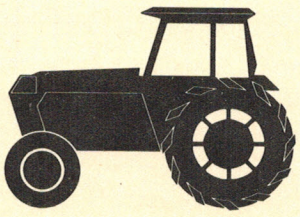
3. Evaluate. $\left(\frac{16}{81}\right)^{-3/4}$ **3.** _____

4. ***Balance in an Account*** $2500 is deposited in an account paying 7.5% annual interest, compounded quarterly. Find its value after 5 years. **4.** _____

5. Use a calculator to evaluate $15^{5/4}$ to three decimal places. **5.** _____

6. Evaluate $\sqrt[6]{15181}$ to three decimal places. **6.** _____

7. ***Depreciated Value*** New farm equipment costs $60,000. If it depreciates 11% each year, find its value to the nearest $100 after ten years. **7.** _____



8. Simplify. $\sqrt{32} - \sqrt{98} + 3\sqrt{50}$

8. _____

9. Expand the expression. $\ln \sqrt[4]{\dfrac{x^2 z}{y^3}}$

9. _____

10. Use a calculator to evaluate $e^{-0.417}$ to three decimal places.

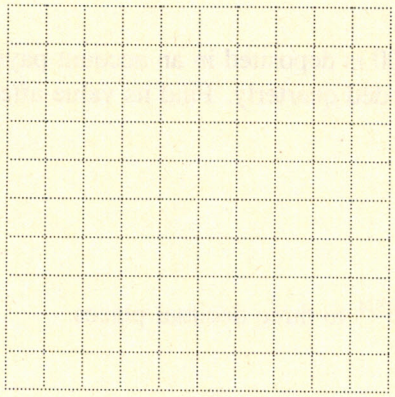
10. _____

11. Solve for x. $\log_3(2x + 3) - \log_3 4 = \log_3 x$

11. _____

12. Sketch the graph of the function.

$f(x) = 2(e^{-x} - 1)$



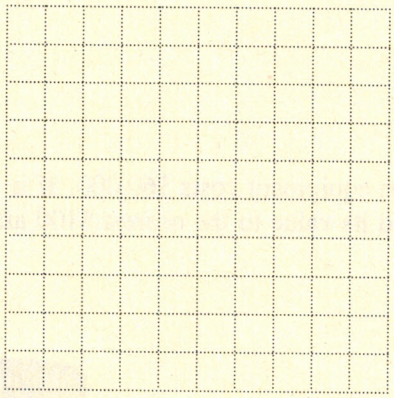
12. *Use graph at left.*

13. Evaluate $\log_7 92$ to three decimal places.

13. _____

14. Sketch the graph of the function.

$f(x) = \ln(x + 1)$



14. *Use graph at left.*

15. Perform the indicated operations.

$(5x + 4)(x^2 - 1) - 3(2 - x^2)$

15. _____

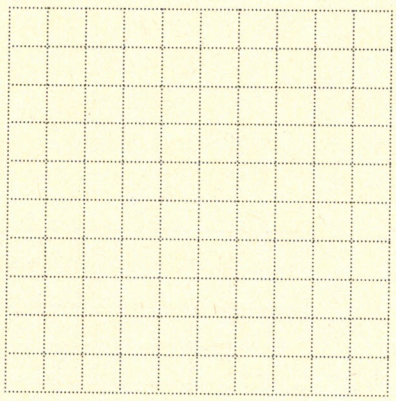
16. Factor completely with respect to the integers.

$x^3 + 3x^2 - 9x - 27$

16. _____

17. Sketch the graph of the function.

$g(x) = (x - 2)^3$



17. *Use graph at left.*

18. Perform the division. Write the answer in fractional form.

$(2x^3 + 10x^2 - 11x + 9) \div (x + 6)$

18. _____

19. Write a polynomial whose graph has the given x-intercepts and has a leading coefficient of 1.

$(-1, 0), (2, 0), (-3, 0)$

19. _____

20. Find all real zeros of the function.

$g(x) = x^3 + 2x^2 - 5x - 10$

20. _____

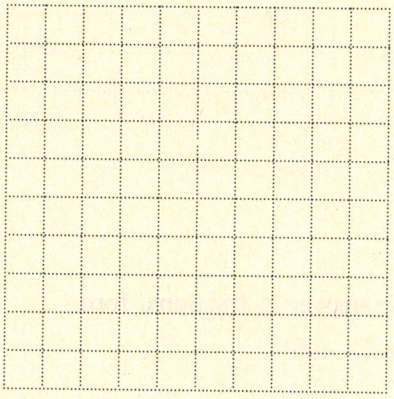
21. Find the *range*, the *mean*, and the *standard deviation* of the set of data. Round your result to two decimal places.

52.1, 47.8, 49.4, 53.7, 45.1, 49.2, 47.3, 48.5, 48.3, 46.3

21. _____

22. Sketch the graph of the function. Identify any asymptotes.

$f(x) = \dfrac{1 - x}{x + 1}$



22. _____
Use graph at left.

23. x and y vary inversely. $x = 12$ when $y = \frac{4}{3}$. Find an equation that relates the variables.

23. _____

24. Perform the indicated operations and simplify. **24.** _____

$$\frac{x^2+3x-10}{x^3-4x} \div \frac{x^2+5x}{x^2+2x}$$

25. Solve the equation. **25.** _____

$$\frac{x}{45} - \frac{2}{x} = \frac{1}{5}$$

26. ***Average Cost*** Startup costs for producing a product is \$12,000. Thereafter, each item costs \$6 to produce. How many must be produced to bring the *average cost* per item down to \$26? **26.** _____

27. Simplify the complex fraction. **27.** _____

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

28. ***Total Interest*** Use the formula as given to find the monthly payment required to pay off a \$2000 loan at 12% annual interest in 3 years. What is the total interest cost of the loan? **28.** _____

$$M = P\left[\frac{i}{1-\left(\frac{1}{1+i}\right)^{12t}}\right]$$

($i = \frac{r}{12}$; r is the annual rate; t is in years)