Name: _____ **Algebra 2 – Final EXTRA Review #2** **Due:** _____

1. Factor: $27b^3 - 64$

$(3b-4)(9b^2+12b+16)$

2. Find the remainder:
$(3x^4 - 2x^3 + x^2 + 5x + 10) \div (x-2)$

2	3	-2	1	5	10
		6	8	18	46
	3	4	9	23	56

Remainder = 56

3. If -1, 1+3i, and 7 are roots of a quartic polynomial, what is the other root?

$1-3i$

4. Describe the end behavior of $f(x) = 3x^4 - 5$.

$x \to -\infty$ $f(x) \to \infty$
$x \to +\infty$ $f(x) \to \infty$

Even, +

U

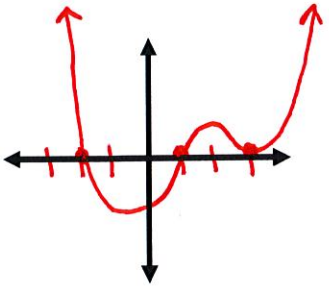
5. Find all the zeros of $f(x) = x^3 - 3x^2 + 9x - 27$

$x^2(x-3) + 9(x-3)$

$(x^2+9)(x-3) = 0$

$x = 3, \pm 3i$

6. **Sketch** a graph of a polynomial with the zeros x = -2, 1, 3, 3



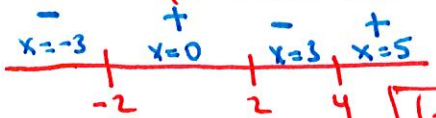
7. Solve: $x^3 - 4x^2 - 4x > -16$

$x^3 - 4x^2 - 4x + 16 > 0$

$x^2(x-4) - 4(x-4) > 0$

$(x^2-4)(x-4) > 0$ Above Parenthesis

$(x-2)(x+2)(x-4) > 0$



$(-2,2) \cup (4,\infty)$

8. Find the values for which the functions is undefined $f(x) = \dfrac{x^2-1}{x^2+x-6}$

x^2+x-6

$(x+3)(x-2)$

Undefined at $x = -3$ and $x = 2$

9. Simplify $f(x) = \dfrac{x^2+7x-18}{x^2-4}$

$\dfrac{(x+9)(x-2)}{(x+2)(x-2)}$

$f(x) = \dfrac{x+9}{x+2}$

10. Add $\dfrac{2}{x-3} + \dfrac{3x}{x-3}$

$\dfrac{3x+2}{x-3}$

Name: _____ **Algebra 2 – Final EXTRA Review #2** **Due:** _____

11. Divide $\frac{x^2+x-12}{x^2+6x+8} \div \frac{x^2-x-6}{x^2+2x}$

$\frac{(x+4)(x-3)}{(x+4)(x+2)} \cdot \frac{x(x+2)}{(x-3)(x+6)}$

$\frac{x}{x+6}$

12. Solve $\frac{2x}{x-2} = 3 + \frac{5}{x-2}$

$2x = 3(x-2)+5$

$2x = 3x-6+5$

$2x = 3x-1$

$-x = -1$

$x = 1$

13. Find the hole $f(x) = \frac{x^2+6x-27}{x^2+15x+54}$

Hole $(-9, 4)$

$\frac{(x+9)(x-3)}{(x+9)(x+6)}$ $\frac{-12}{-3}$

14. Find the equation of the slant asymptote of $f(x) = \frac{x^2+3x-5}{x+2}$

$-2 \mid 1 \quad 3 \quad -5$

$\quad\quad -2 \quad -2$

$\quad 1 \quad 1 \quad (-7)$

$y = x+1$

15. Find the x-intercepts and the y-intercept of $f(x) = \frac{x^2-x-12}{x^2-2}$

$(x-4)(x+3)$

x-int $(4,0)$ $(-3,0)$

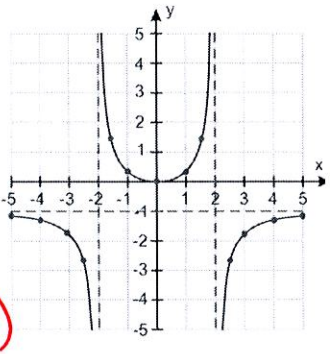
y-int $(0,6)$

16. Determine the horizontal and vertical asymptotes of $f(x) = \frac{6x+5}{3x-1}$

VA: $x = 1/3$

HA: $y = 2$

17. Find the domain and range of the function.



D: $(-\infty, -2) \cup (-2, 2) \cup (2, \infty)$

R: $(-\infty, -1) \cup [0, \infty)$

18. Find the domain and range of $f(x) = -\sqrt{(x-2)} + 5$

D: $[2, \infty)$

R: $(-\infty, 5]$

19. Solve $\sqrt{11x-8} = x+2$

$11x-8 = x^2+4x+4$

$-11x+8 \quad -11x+8$

$0 = x^2-7x+12$

$0 = (x-4)(x-3)$

$x = 4$ $x = 3$

20. Find the starting point of $f(x) = -\sqrt{\frac{1}{2}(x+4)} - 7$

$(-4, -7)$

Name: _____ **Algebra 2 – Final EXTRA Review #2** **Due:** _____

21. Solve $-3(x+2)^{1/3} = 12$

$(x+2)^{1/3} = -4$

Raise to 3rd power $x+2 = -64$

$x = -66$

22. Condense the following:

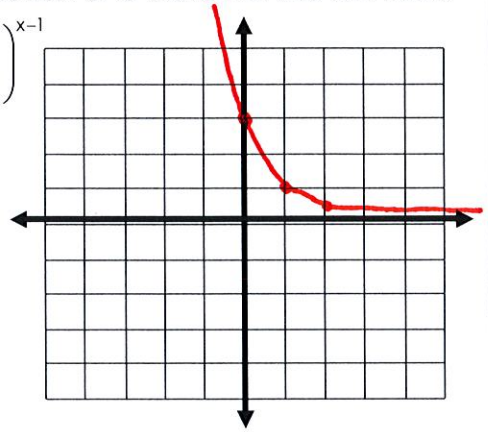
$\frac{1}{3}\log x + 3\log z - \log y - \log 3$

$\log x^{1/3} + \log z^3 - \log y - \log 3$

$\log \frac{\sqrt[3]{x}\, z^3}{3y}$

23. Graph the function and state the domain and range: $y = \left(\frac{1}{3}\right)^{x-1}$

x	y
0	3
1	1
2	1/3



24. The number of bacteria N in a culture is given by the model $N = 120e^{0.235t}$ where t is in hours. Find the number of bacteria after 8 hours.

$120e^{.235(8)}$

$N = 786.42$

25. Solve: $\log_4(x+2) - 7 = -4$

$\log_4(x+2) = 3$

$x+2 = 4^3$

$x+2 = 64$

$x = 62$

26. Solve: $e^{2x} + 5 = 12$

$e^{2x} = 7$

$2x = \ln 7$

$x = 0.973$

27. If \$1800 is invested at a rate of 14% compounded continuously, Find the balance in the account after 8 years.

$A = Pe^{rt}$

$A = 1800e^{.14 \cdot 8}$

$A = \$5516.74$

28. Identify if the following are increasing or decreasing.

a. $y = 2\left(\frac{3}{5}\right)^{x-2}$ Decreasing

b. $y = 6(2)^x$ Increasing

29. Solve: $9^{2x} = 27^{x+2}$

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

$3^{4x} = 3^{3x+6}$

$4x = 3x + 6$

$x = 6$

30. Write the standard form of the equation of an exponential function with a base of 10, $y = 10^x$, that has been reflected over the y-axis, shifted left 3, and up 3.

$y = -10^{x+3} + 3$

Name: _____ **Algebra 2 – Final EXTRA Review #2** Due: _____

31. What are the solutions of the equation $2(x+1)^2 - 4 = 10$

$2(x+1)^2 = 14$

$(x+1)^2 = 7$

$x = -1 \pm \sqrt{7}$

32. Simplify the fraction $\frac{3-2i}{1-4i}$ $\cdot \frac{1+4i}{1+4i}$

$\frac{3+12i-2i-8i^2}{1+4i-4i-16i^2}$ $(i^2 = -1)$

$\frac{11+10i}{17}$ or $\frac{11}{17} + \frac{10}{17}i$

33. Solve the equation: $\frac{1}{4}x^2 + 3 = -8$

$\frac{1}{4}x^2 = -11$

$x^2 = -44$

$x = \pm 2i\sqrt{11}$

34. Use the quadratic equation to solve the following: $x^2 + 6x - 5 = 0$

$\frac{-6 \pm \sqrt{36-4(1)(-5)}}{2}$

$\frac{-6 \pm \sqrt{56}}{2}$

$\frac{-6 \pm 2\sqrt{14}}{2}$

$-3 \pm \sqrt{14}$

35. What number would we need to add to $x^2 + 8x = -10$ if you want to complete the square?

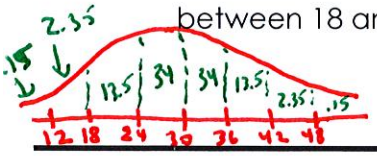
Add 16

36. Find the x-intercepts for the following equation: $x^2 + 2x - 15 = 0$

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

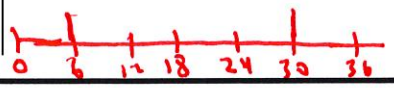
$(-5, 0)$ $(3, 0)$

37. A normal distribution has a mean of 30 and a standard deviation of 6. Draw the normal curve and find the probability between 18 and 36.



.815

38. A normal distribution of ACT scores has a mean score of 18 and a standard deviation of 6. Within what range do about 95% of the scores fall?

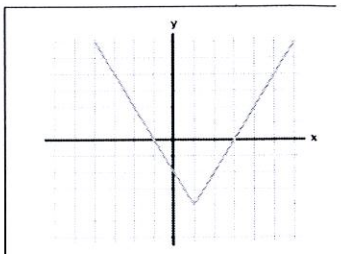


6 to 30

39. List the 6 types of Sampling Methods (be able to give an example of each)

40. Where is the graph decreasing?

$(-\infty, 1)$



41. Find the sum of the first 10 terms of the sequence -1, -4, -16, -64, ...

$a_1 = -1$

$r = 4$

$S_{10} = \frac{-1(1-4^{10})}{1-4}$

$S_{10} = -349,525$

42. Graph $f(x) = \begin{cases} (x+1)^2 & x < 1 \text{ open} \\ -x+2 & x \geq 1 \text{ closed} \end{cases}$