Honors Algebra 2 **Name** ____________________________

Final Exam Review

1. **Divide.** $(x^3 + 5x^2 - 7x + 2) \div (x + 2)$	**2.** **Find the quotient.** $(2x^3 + 17x^2 + 23x - 42) \div (2x + 7)$
3. **Subtract.** $(9z^2 + 3z - 7) - (4z^2 - 8z + 9)$	**4.** **Multiply.** $(3x + 8)(4x - 2)(5x + 7)$
5. **Simplify.** $\left(\frac{(x^2y^{-3})}{(xy^4)^{-1}}\right)^5$	**6.** **Simplify.** $(-2a^5b^3)^6 \bullet (-4a^5b^6)^{-3}$
7. **Solve.** $3x^5 + 15x = 18x^3$	**8.** **Write the answer in scientific notation.** $(3.2 \times 10^5)(7 \times 10^{-2})$

9. **Factor completely.** $2z^4 - 1250$

10. **Factor completely.** $d^4 - 7d^2 + 10$

11. **Factor completely.**
$x^5 - 25x^3 + 64x^2 - 1600$

12. **Find all the factors, zeros, and x-intercepts.**
$f(x) = x^3 - 6x^2 + 4x - 24$

13. **Find all the factors, zeros, and x-intercepts.**
$f(x) = x^4 + 2x^3 - 5x^2 - 12x - 4$

14. **Find all the factors, zeros, and x-intercepts.**
$f(x) = x^4 + 5x^3 + 4x^2 + 20x$

15. **Find the value of *k* so the remainder is 7.**
$(x^3 + kx^2 - 9) \div (x + 2)$

16. **Find the value of *k* so the remainder is 1.**
$(x^2 + 3x + 3) \div (x - k)$

17.

Degree: Even / Odd

Leading Coefficient: Positive / Negative

How many Relative Maxima:

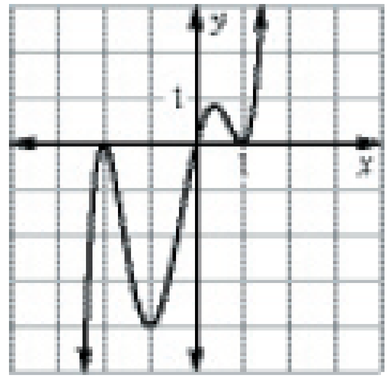
How Many Relative Minima:

Least Degree of the polynomial:

Real Zeros:

Known factors based on the real zeros:

Domain and Range:



18. **Write a polynomial function of least degree with a leading coefficient of 1 given the following zeros:** $-4, \quad 7-\sqrt{5}$

19. **Write a polynomial function of least degree with a leading coefficient of 1 given the following zeros:** $0\ (\textit{double}), \quad 3+2i$

20. **Given the functions, perform the indicated operations.**

$f(x) = x + 8 \qquad g(x) = x^2 - 9 \qquad h(x) = 2x + 1$

a) $[h \quad g](3)$ b) $[g \quad f \quad h](x)$ c) $f(x) - g(x)$

21. **Simplify.** $\sqrt[3]{\dfrac{343a^{12}b^9}{27c^2}}$

22. **Simplify.** $\dfrac{x^{-\frac{1}{3}} + 3x^{\frac{1}{3}}}{\sqrt[3]{x^{-2}}}$

23. **Simplify.** $\sqrt[5]{\sqrt[4]{x^{40}}}$	**24.** **Simplify.** $\sqrt{49x^2 + 56x + 16}$
25. **Solve.** $\sqrt{2x+1} = x + 5$	**26.** **Solve.** $\frac{1}{3}\left(2x+4\right)^{\frac{2}{3}} = \frac{16}{3}$
27. **Solve.** $\sqrt{5x+6} + 3 = \sqrt{3x+3} + 4$	**28.** **Solve.** $\sqrt{k+25} - \sqrt{k} > \sqrt{5}$
29. **Solve.** $\sqrt{x+10} + \sqrt{x-6} < 8$	**30.** **Find the inverse of** $f(x) = 16\left(x+6\right)^2 - 9$

31. **Find the inverse of** $g(x) = \dfrac{2x^3 - 6}{9}$	32. **Verify algebraically that the following functions are inverses of each other.** $f(x) = 3x + 9$ $g(x) = \dfrac{1}{3}x - 3$

33. **Use** $\log_9 7 \approx 0.8856$ **and** $\log_9 4 \approx 0.6309$ **to evaluate the following:**

a) $\log_9 \dfrac{7}{4}$ b) $\log_9 28$ c) $\log_9 324$ d) $\log_9 \dfrac{112}{36}$

34. **Evaluate.** $7^{\log_7 (x-5)}$	35. **Evaluate.** $\log_7 \sqrt[9]{7}$
36. **Evaluate.** $\log_8(\log_5 5)$	37. **Evaluate.** $\log_2 \dfrac{1}{64}$
38. **Solve.** $\log_6(7x - 11) = \log_6(2x + 9)$	39. **Solve.** $\log_7(x^2 + 6x) = \log_7(x - 4)$

40. **Solve.** $\log_{16}(9x+5)-\log_{16}(x^2-1)=\frac{1}{2}$

41. **Solve.** $5^{3x}=4^{x+3}$

42. **Solve.** $\log_4(5-x)^3=6$

43. **Solve.** $\log_9 x=\frac{1}{3}\log_9 64+\frac{1}{4}\log_9 81$

44. **Solve.** $\log_4 16-\log_4\frac{1}{4}+\log_4 5=\log_4 3x$

45. **Solve.**
$\log_6(3m+7)-\log_6(m+4)=2\log_6 6-3\log_6 3$

46. **Graph** $y=\log_{\frac{1}{2}}(x+3)$.

Domain:

Range:

x-intercept(s):

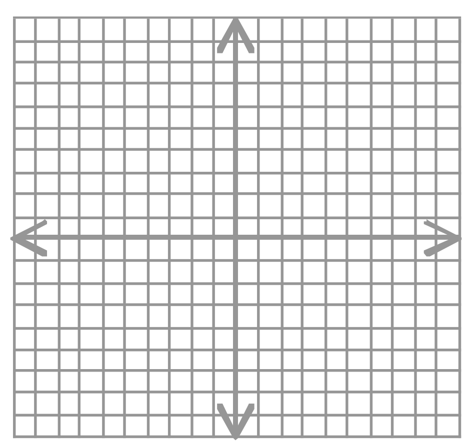
y-intercept(s):

Horizontal Asymptote(s):

Vertical Asymptote(s):

End Behavior:

x	y



47. **Rewrite the following function in $f(x) = ab^x$ form using properties of exponents. State if it is a growth or decay exponential function.**

$$f(x) = \frac{1}{4} \bullet 2^{-x-1}$$

48. **Rewrite the following function in $f(x) = ab^x$ form using properties of exponents. State if it is a growth or decay exponential function.**

$$f(x) = 2(27)^{\frac{x}{3}}$$

49. **Write an exponential function whose graph passes through the points:** $(-3,\ 243)$ $\left(0,\ \frac{1}{3}\right)$

50. **Write an exponential function whose graph passes through the points:** $(1,\ 1.25)$ $(3,\ 31.25)$

51. **Given the parent function** $f(x) = \left(\frac{1}{6}\right)^x$**, write the equation for the function** $g(x)$ **after each of the following transformations.**

a) Vertically stretch by a factor of 4, shifted down 3 units, and reflected over the y-axis.

b) Horizontally compress by a factor of $\frac{1}{5}$ and reflected over the x-axis.

c) Horizontally stretched by a factor of 8 and shifted down 3 units.

52. **Graph** $f(x) = 2^{(x-1)} - 3$

Domain:

Range:

x-intercept(s):

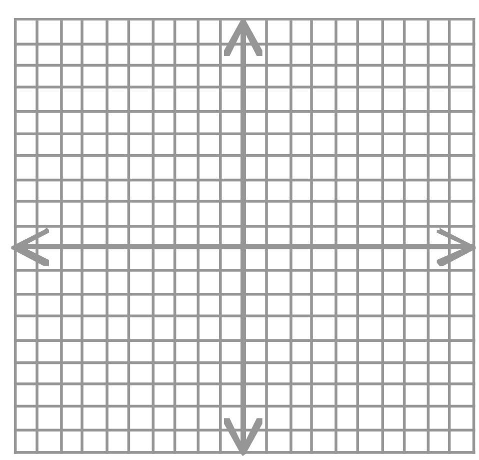
y-intercept(s):

Horizontal Asymptote(s):

Vertical Asymptote(s):

End Behavior:

x	y



53. **Graph** $f(x) = \left(\frac{1}{3}\right)^{(x+2)} - 4$

Domain:

Range:

x-intercept(s):

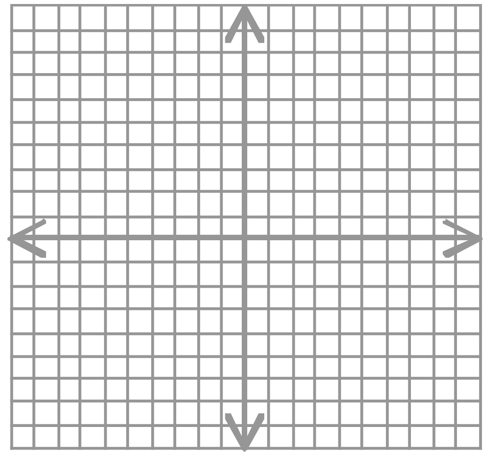
y-intercept(s):

Horizontal Asymptote(s):

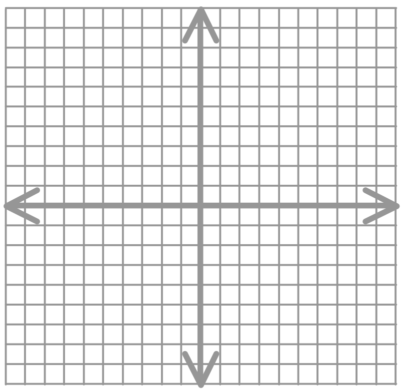
Vertical Asymptote(s):

End Behavior:

x	y



54. $f(x) = \left(\frac{1}{3}\right)^{x}$

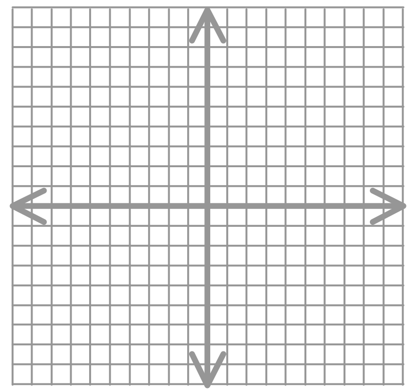


Transformation: Reflect the graph over the x-axis.

a. How did the coordinates change?

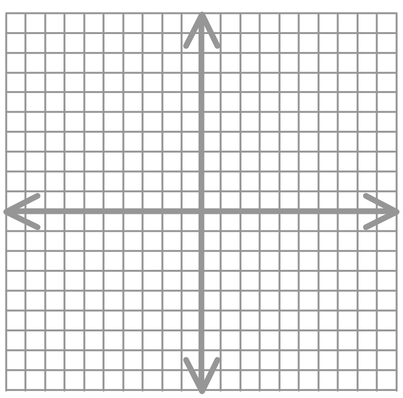
b. What equation would result from the transformation?

c. Complete the table.



x				
y				

55. $f(x) = 2^{x}$

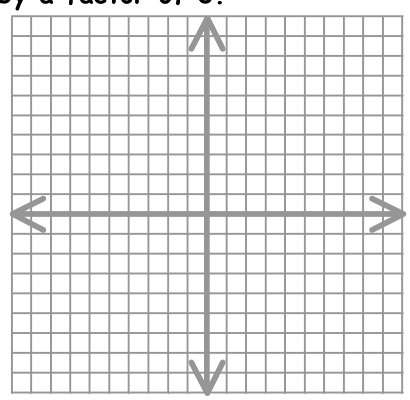


Transformation: Horizontally stretch by a factor of 3.

a. How did the coordinates change?

b. What equation would result from the transformation?

c. Complete the table.



x				
y				

56. **In 1992, 1,219 monk parakeets were observed in the United States. For the next 11 years, about 12% more parakeets were observed each year. Use the formula** $A = P(1 \pm r)^n$.

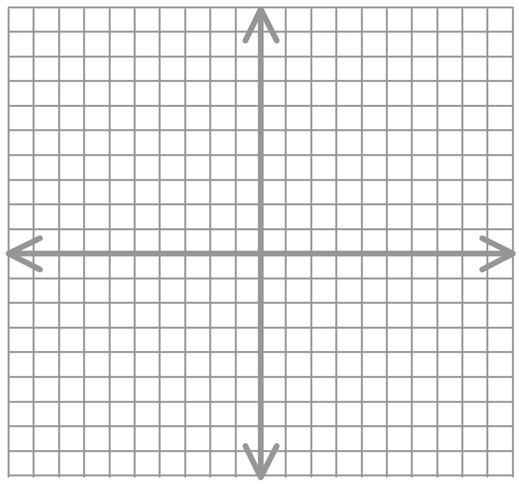
a. Write an exponential function showing the growth of the parakeets.

b. In 1998, about how many parakeets were observed in the US?

c. In what year were 1,712 parakeets observed?

57. **Graph the function. State the domain, range, x-intercept(s), y-intercept(s), vertical asymptote(s), and horizontal asymptote(s).**

$f(x)=\dfrac{3x^2}{x^2-16}$



VA: ________________

HA: ________________

x-intercept(s): ________________

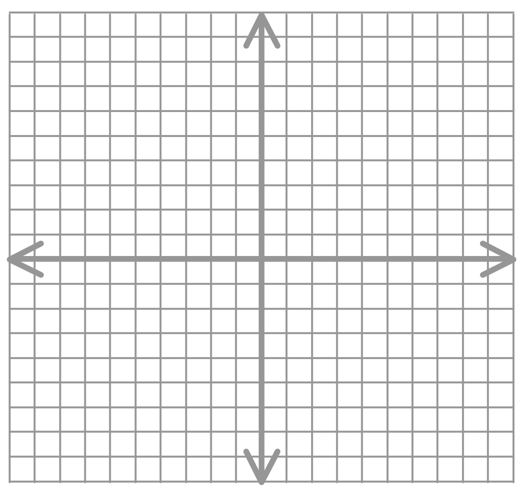
y-intercept(s): ________________

Domain: ________________

Range: ________________

58. **Graph the function. State the domain, range, x-intercept(s), y-intercept(s), vertical asymptote(s), and horizontal asymptote(s).**

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



VA: ________________

HA: ________________

x-intercept(s): ________________

y-intercept(s): ________________

Domain: ________________

Range: ________________

59. **Simplify.** $\dfrac{x+5}{x^2+10x+25}\bullet\dfrac{2x+10}{3x+15}$

60. **Simplify.** $\dfrac{3x^2-3}{2x^2+8x+6}\div\dfrac{5x^2-10x+5}{4x+12}$

61. **Simplify.** $\dfrac{\dfrac{3}{x-2}-\dfrac{6}{x^2-4}}{\dfrac{3}{x+2}+\dfrac{1}{x-2}}$

62. **Simplify.** $\dfrac{16x^2}{4x-8} \div \dfrac{x}{x^2-4} \bullet \dfrac{8}{x+2}$

63. **Simplify.** $\dfrac{x+1}{x^2+4x+4}-\dfrac{6}{x^2-4}$

64. **Simplify.** $\dfrac{\dfrac{r+6}{r}-\dfrac{1}{r+2}}{\dfrac{r^2+4r+3}{r^2+r}}$

65. **Solve.** $\dfrac{18}{x^2-3x}-\dfrac{6}{x-3}=\dfrac{5}{x}$

66. **Solve.** $\dfrac{x+2}{2x+1}=\dfrac{x}{3}+\dfrac{3}{4x+2}$

67. **Solve.** $\dfrac{1}{4x-3}+\dfrac{5}{x}=27$

68. **Solve.** $\dfrac{3}{x-4}-\dfrac{1}{x+4}\le\dfrac{40}{x^2-16}$