

Name \_\_\_\_\_

Final Exam Review

1. Find the Quotient:  $\frac{x^2 - 16}{x^2 - 9x + 20} \div \frac{x^2 + 10x + 24}{x^2 + x - 30}$

2. Simplify completely:  $\frac{8p}{p^2 - 25} - \frac{7}{p + 5}$

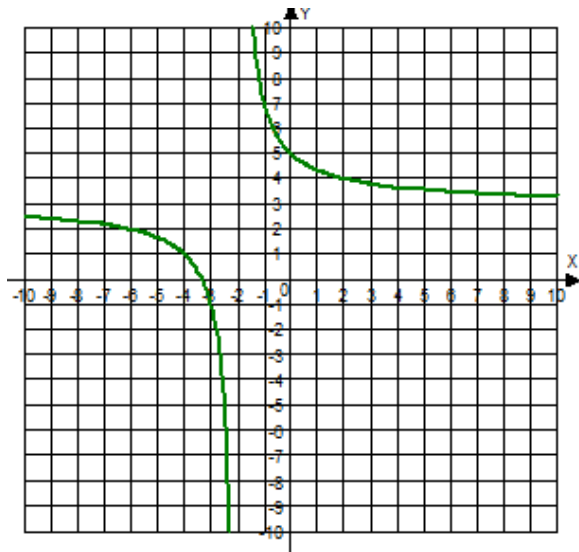
3. Simplify:  $\frac{m}{m - 5} + \frac{m + 3}{8}$

4. Solve:  $\frac{x}{5 - x} + \frac{5}{x - 5} = 6$

5. What is/are the solutions of the equation?  $\frac{-3}{x - 7} + x = \frac{7 - 4x}{x - 7}$

6. Which equation has the graph shown?

a.  $f(x) = \frac{4}{x - 2} + 3$     b.  $f(x) = \frac{4}{x + 2} - 3$     c.  $f(x) = \frac{4}{x - 2} - 3$     d.  $f(x) = \frac{4}{x + 2} + 3$



7. Simplify the expression:  $\frac{\frac{5x}{x+7}}{\frac{x}{x^2-49}}$

8. What is the lowest common denominator of  $\frac{7}{x^2-x-20} - \frac{8}{7x+28} + \frac{10}{4x+12}$  ?

9. Which set of ordered pairs does NOT represent a function?

- A.  $\{(-5,7), (7,-5), (8,-3), (-3,8)\}$       B.  $\{(-5,7), (8,5), (2,-8), (10,-2)\}$   
C.  $\{(-5,7), (2,7), (8,7), (10,7)\}$       D.  $\{(-5,7), (8,-3), (-3,5), (-5,-8)\}$

10. If  $f(x) = -6x - 5$  and  $g(x) = x^2 + 6$ , then  $f(g(-4))$  is equal to?

11. Find the inverse of the function  $f(x) = \sqrt{x-5}$

12. Solve  $\sqrt[3]{x+2} - 15 = -11$

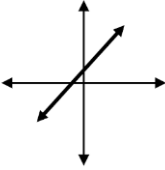
13. What is the solution set of the equation  $\sqrt{3x+18} = x$ ?

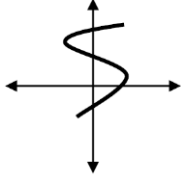
14. What is the solution of the equation  $5x^{\frac{5}{3}} = 160$  ?

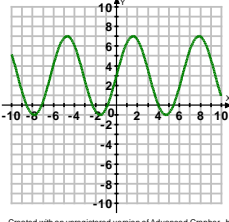
15. Given  $f(x) = -4x - 9$  and  $g(x) = -6x^2 - 11$ , find  $f(x) - g(x)$

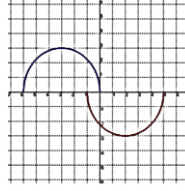
16. What is the domain of the function  $y = \sqrt{x+8} - 20$  ?

17. Which of these graphs is one - to - one?

A. 

B. 

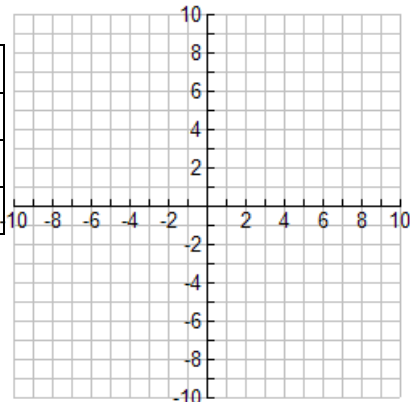
C.   
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D. 

Graph and analyze the following exponential growth functions. Your graph should show the y-intercept, the asymptote, and at least two additional points.

18.  $f(x) = \left(\frac{1}{3}\right)^{x-4} + 4$

x	f(x)



y-intercept \_\_\_\_\_ asymptote \_\_\_\_\_

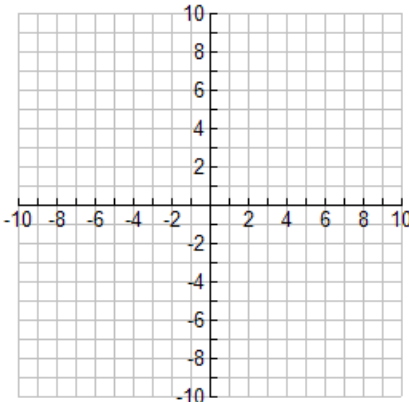
domain \_\_\_\_\_ range \_\_\_\_\_

end behavior: as  $x \rightarrow +\infty$ ,  $f(x) \rightarrow$  \_\_\_\_\_, and \_\_\_\_\_

as  $x \rightarrow -\infty$ ,  $f(x) \rightarrow$  \_\_\_\_\_

19.  $f(x) = e^x - 6$

x	f(x)



y-intercept \_\_\_\_\_ asymptote \_\_\_\_\_

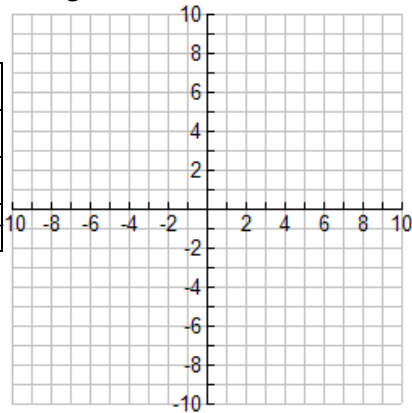
domain \_\_\_\_\_ range \_\_\_\_\_

end behavior: as  $x \rightarrow +\infty$ ,  $f(x) \rightarrow$  \_\_\_\_\_, and \_\_\_\_\_

as  $x \rightarrow -\infty$ ,  $f(x) \rightarrow$  \_\_\_\_\_

20.  $f(x) = -3^{x+1} - 3$

x	f(x)



y-intercept \_\_\_\_\_ asymptote \_\_\_\_\_

\_\_\_\_\_

domain \_\_\_\_\_ range \_\_\_\_\_

\_\_\_\_\_

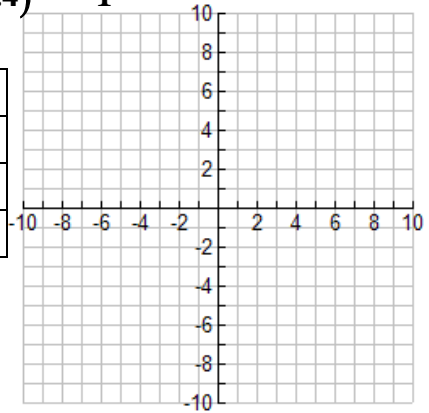
end behavior: as  $x \rightarrow +\infty$ ,  $f(x) \rightarrow$  \_\_\_\_\_, and \_\_\_\_\_

as  $x \rightarrow -\infty$ ,  $f(x) \rightarrow$  \_\_\_\_\_

\_\_\_\_\_

21.  $f(x) = (.4)^{x-2} - 1$

x	f(x)



y-intercept \_\_\_\_\_ asymptote \_\_\_\_\_

domain \_\_\_\_\_ range \_\_\_\_\_

end behavior: as  $x \rightarrow +\infty$ ,  $f(x) \rightarrow$  \_\_\_\_\_, and \_\_\_\_\_

as  $x \rightarrow -\infty$ ,  $f(x) \rightarrow$  \_\_\_\_\_

Read each of the following applications problems carefully. Determine whether the situation models growth or decay, compounded or continuously compounded interest. Write an equation to model the problem, then solve. Round appropriately

$$y = a\left(1 + \frac{r}{n}\right)^{nt}$$

$$y = Pe^{rt}$$

$$y = a(1+r)^t$$

$$y = a(1-r)^t$$

22. Know what n is in each of these situations for compound interest:

Annually, semi-annually, quarterly, monthly, weekly, daily, bi-weekly.

23. Ten students have contracted a stomach bug. It is estimated that the virus spreads at a rate of 13% each day. How many students will be affected after 2 weeks?

24. The local credit union is advertising  $4\frac{7}{8}\%$  interest compounded continuously. If you invest your \$150,000 inheritance, how much money would you have at the end of 20 years?

25. An alien colony of 2000 was discovered by the X-Files team. The aliens are an endangered species and their population decreases at an average rate of 12% each day. How many aliens will be in the colony after 3 weeks?

26. A \$74,000 luxury SUV is estimated to lose its value at a rate of approximately 9.2% each year. What will its value be after 3 years?

27. A family of six vampires has just moved into Legacy Park. If the vampire population grows at a rate of 25% each day, how many vampires will there be in two weeks?

28. Congratulations! You have finally saved the \$50,000 you needed to put a down payment on a house. If your money has been in an account that paid  $6\frac{7}{8}\%$  interest compounded semi-annually for the last 10 years, how much money did you invest?

29. The equation  $C = 5600(1.12)^t$  models the tuition at a private college since the year 1984.

A. Is the tuition increasing or decreasing? How do you know?

B. What was the tuition in 1984?

C. What is the growth/depreciation rate of the tuition?

D. Estimate the tuition for this year.

30. The equation  $V = 34,950(.928)^t$  models the value of a car  $t$  years after its initial purchase in 2013 .

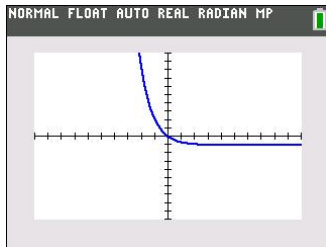
- A. Is the value of the car increasing or decreasing? How do you know?
- B. What was the value of the car in 2013?
- C. What is the growth/decay rate of the car?
- D. Approximate the value of the car now.

31. If you invest \$2000 into an account that pays 5.15% interest compounded daily, how much interest will you earn if you do not touch it until 2020?

Multiple Choice

32. Suppose the amount of radioactive substance remaining in a 100 milligram sample after  $t$  years can be modeled by  $A = 100e^{-0.01653t}$ . How much is remaining after 24 years?

- A. 0.67 mg
- B. 39.67 mg
- C. 148.69 mg
- D. 67.25 mg



33. What is the equation of the graph above?

- A.  $f(x) = 3(3)^x$
- B.  $f(x) = 3\left(\frac{1}{3}\right)^x$
- C.  $f(x) = -3(3)^x$
- D.  $f(x) = \left(\frac{1}{3}\right)^x - 1$

34. The domain of an exponential function is always \_\_\_\_\_.

35. The asymptote of an exponential function is the \_\_\_\_\_.

36. What does the range of an exponential equation always depend upon?  
\_\_\_\_\_.

37. What is the y-intercept of the function?  $f(x) = -4(3)^{x+5} + 52$

38. The equation represents the growth of bacteria in a petri dish  $P = 50(1.11)^t$  after  $t$  hours.

Which of these statements is **NOT** true?

- A. The bacteria are growing at a rate of .11% each hour.
- B. There are 50 bacteria at the beginning of the experiment.
- C. The population will be less than 10,000 after two days.
- D. The population will be greater than 150 after 12 hours.