PRECALCULUS: REVIEW FOR MIDTERM

1. Factor .

2. Solve by factoring: 

3. Simplify .

4. Combine into a single fraction in lowest terms: 

5. Solve: 

6. Give the domain and range for 

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| 7. The graph of is shown. For what values of *x* is it discontinuous? Tell whether the discontinuities are removable or nonremovable. |  |

8. Graph . On what intervals is increasing? Decreasing? Give the coordinates of any local extrema.

9. Out of the 12 parent functions that you are to know, which ones are bounded?

***Graph without a calculator:***

10.  11.  12. 

13. Write a piecewise function for  .

14. Graph the piecewise function 

15. If , find .

16. If , define two functions  and  such that .

17. If , find .

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| 18. Given the graph of , sketch the graph of  on the same set of axes. |  |

19. Describe the transformations to  that produce the graph of .

20. Which is a power function? How can you tell?

  

21. Describe the end behavior of  using proper limit notation.

22. Use what you know about zeros, multiplicity, and end behavior to graph .

23. Find the rational zeros of .

24. Find the real and complex zeros of .

25. Use the Remainder Theorem to prove that if  is divided by (*x* – 5), then the remainder is 3.

26. Use the “6 step method” to graph  without a calculator.

27. Use the “6 step method” to graph  without a calculator.

28. The total electrical resistance R of 2 resistors R1 and R2 connected in parallel is . Suppose that the total resistance is 1.2 ohms.

a. Let x = R1. Express R2 as a function of *x*.

b. Find R2 if *x* = 3.

29. An exponential function passes through the points (0, 2) and (1, 1/*e*). Write a formula for this exponential function.

30. Given the logistics equation , what are the equations of the horizontal asymptotes? What is the initial value of the function?

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| 31. Write a logistics function that models the information on the graph. |  |

32. Evaluate  on your calculator.

33. Solve  without a calculator.

34. Evaluate  without a calculator.

35. Solve  without a calculator.

36. Solve .

37. Solve .

38. Solve .

39. A cake is removed from an oven at 220°F and cools to 150°F after 35 minutes in a room that is 75°F. How long will it take for the cake to cool to 95°F?

40. Find the APY (Annual Percentage Yield) for an investment that earns 4.25% compounded monthly.

41. What interest rate compounded monthly is required to an $8500 investment to triple in 5 years?

42. The number of rabbits in Elkgrove doubles every month. There are 20 rabbits initially. Let t be time in months. Write an exponential model for the rabbit growth. How many rabbits will there be in 5 years? When will there be 10,000 rabbits?

43. Amy contributes $50 per month into a mutual fund that earns 7.26% interest compounded quarterly. What is the value of her account in 25 years?