

2016 Algebra 2B Final Exam Review

1. The table shows the location and magnitude of some notable earthquakes. How many times more energy was released by the earthquake in Peru than by the earthquake in Afghanistan? Use the given equation for comparing earthquake intensity level and magnitude.

$$\log \frac{I_1}{I_2} = M_1 - M_2$$

Earthquake Location	Date	Richter Scale Measure
Italy	October 31, 2002	5.9
El Salvador	February 13, 2001	6.6
Afghanistan	May 30, 1998	6.9
Mexico	January 22, 2003	7.6
Peru	June 23, 2001	8.1

Graph the logarithmic equation.

2. $y = \log_6 x$
3. $y = \log(x - 5) - 3$

Write the expression as a single logarithm.

4. $7 \log_b q + 6 \log_b x$
5. $\log_2 32 - \log_2 4$

Expand the logarithmic expression.

6. $\log_9 \frac{n}{2}$
7. $\log_7 4b^3$
8. What is the value of $\log_{27} 3$?

a. 27

c. $\frac{1}{27}$

b. $\frac{1}{3}$

d. 3

Solve the exponential equation.

9. $9^{9x} = 27$

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10. Solve $12^{7x} = 7$. Round to the nearest ten-thousandth.

Solve the logarithmic equation. Round to the nearest ten-thousandth if necessary.

11. Solve $\log(7x + 8) = 3$.

12. Solve $\log 5x - \log 6 = 1$. Round to the nearest hundredth if necessary.

Write the expression as a single natural logarithm.

13. $3 \ln 6 + 6 \ln x$

14. $2 \ln x - 2 \ln a$

15. Simplify $\ln e^3$.

16. Solve $\ln(5x - 4) = 7$. Round to the nearest thousandth.

Use natural logarithms to solve the equation. Round to the nearest thousandth.

17. $5e^{2x+9} = 13$

18. $e^{2x} = 1.4$

19. The sales of lawn mowers t years after a particular model is introduced is given by the function $y = 5500 \ln(9t + 4)$, where y is the number of mowers sold. How many mowers will be sold 4.5 years after a model is introduced? Round the answer to the nearest whole number.

Is the sequence arithmetic? If so, identify the common difference.

20. 10, 13, 16, 19, ...

21. Find the 50th term of the sequence 5, -2, -9, -16, ...

22. Find the 2nd and 3rd term of the sequence -3, ____, ____, -12, -15, ...

23. Find the missing term of the arithmetic sequence 19, ____, 15, ...

What is the sum of the finite arithmetic series?

24. $30 + 34 + 38 + 42 + 46 + \dots + 70$

25. Use summation notation to write the series $59 + 63 + 67 + \dots$ for 12 terms.

26. Evaluate the series $\sum_{n=3}^7 8n$.

Is the sequence geometric? If so, identify the common ratio.

27. 3, -12, -48, -108, ...

What is the fifth term of the geometric sequence?

28. 3, 15, 75, ...

Write the explicit formula for the geometric sequence. Then find the fifth term in the sequence.

29. $a_1 = -4$, $a_2 = 12$, $a_3 = -36$

30. Find the sum of the finite geometric series. $1 + 3 + 9 + 27 + 81 + 243$.

Does the infinite geometric series diverge or converge? Explain.

31. $\frac{1}{6} + \frac{1}{30} + \frac{1}{150} + \frac{1}{750} + \dots$

32. $6 + 18 + 54 + 162 + \dots$

33. A yogurt shop offers 3 different flavors of frozen yogurt and 9 different toppings. How many choices are possible for a single serving of frozen yogurt with one topping?

34. In how many different orders can you line up 3 cards on a table?

35. Evaluate ${}_{10}P_3$.

36. There are 11 students participating in a spelling bee. In how many ways can the students who go first, second, and third in the bee be chosen?

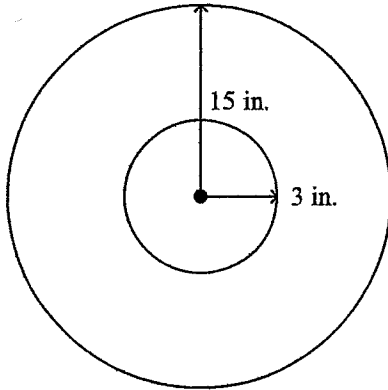
37. Evaluate ${}_7C_5$.

38. Evaluate $\frac{{}_{60}C_3}{{}_{15}C_3}$.

39. In how many ways can 6 singers be selected from 9 who came to an audition?

40. Lynn and Dawn tossed a coin 50 times and got heads 22 times. What is the experimental probability of tossing heads using Lynn and Dawn's results?

41. A bag contains 9 red marbles, 5 white marbles, and 3 blue marbles. Find $P(\text{red or blue})$.
42. A spinner is numbered from 1 through 10 with each number equally likely to occur. What is the probability of obtaining a number less than 3 or greater than 6 in a single spin?
43. If a dart hits the target at random, what is the probability that it will land in the shaded region?



Drawing not to scale

44. Suppose Q and R are independent events. Find $P(Q \text{ and } R)$.
 $P(Q) = 0.28, P(R) = 0.06$
45. Two urns contain white balls and yellow balls. The first urn contains 10 white balls and 10 yellow balls and the second urn contains 8 white balls and 6 yellow balls. A ball is drawn at random from each urn. What is the probability that both balls are white?

Is the pair of events *dependent* or *independent*? Explain

46. You pick a number between 1000 and 5000. Then you flip a coin.
A. INDEPENDENT B. DEPENDENT C. NEITHER

Suppose S and T are mutually exclusive events. Find $P(S \text{ or } T)$.

47. $P(S) = 83\%, P(T) = 6\%$
48. Suppose you roll a standard number cube once. Are rolling a 6 and rolling a 5 mutually exclusive events?
A. YES, they are mutually exclusive. B. NO, they can happen at the same time.
49. A jar contains 3 blue cubes, 2 blue spheres, 6 green cubes, and 7 green spheres. If you select an object at random, what is the probability that the object is green or a cube?

Find the mean, median, and mode of the data set. Round to the nearest tenth.

50. 15, 9, 6, 1, 1, 1, 2, 5, 15, 3, 14

Find the outlier in the set of data.

51. 11, 15, 24, 10, 19, 38, 18, 12

Make a box-and-whisker plot of the data.

52. 12, 14, 22, 11, 20, 27, 26, 13

Find the values of the 30th and 90th percentiles of the data.

53. 129, 113, 200, 100, 105, 132, 100, 176, 146, 152

What are the mean, variance, and standard deviation of these values? Round to the nearest tenth.

54. 92, 52, 53, 84, 84, 56

55. Susan keeps track of the number of tickets sold for each play presented at The Community Theater. Within how many standard deviations from the mean do all the values fall?

81, 60, 92, 126, 167, 150, 93, 122, 107, 60, 122, 134

56. Classify $-6x^4 - x^3 - 9x^2$ by degree.

57. Classify $-2x^5 - 6x^3 - 7x^2 + 8$ by number of terms.

58. Write $5x^2(-4x^2 - 2x^3)$ in standard form.

Consider the leading term of each polynomial function. What is the end behavior of the graph?

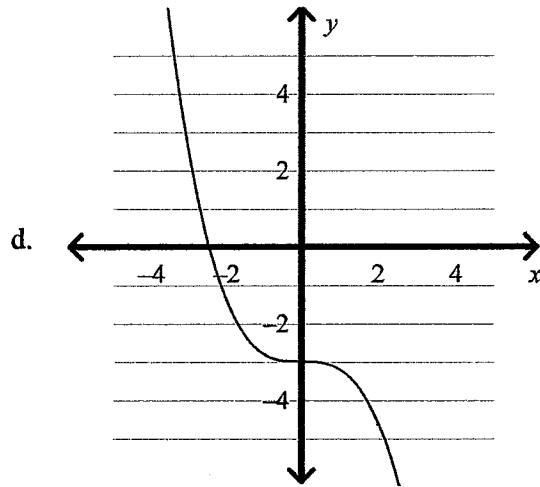
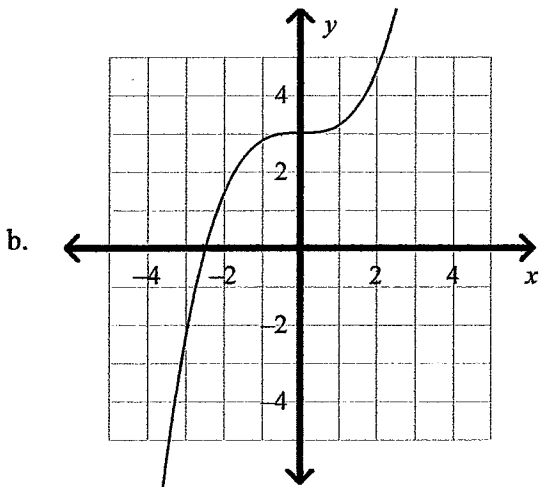
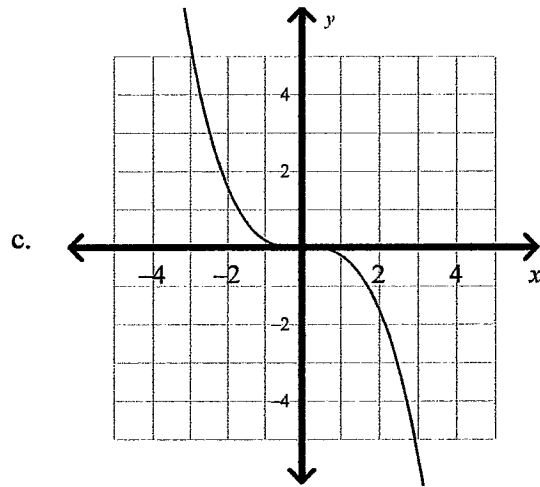
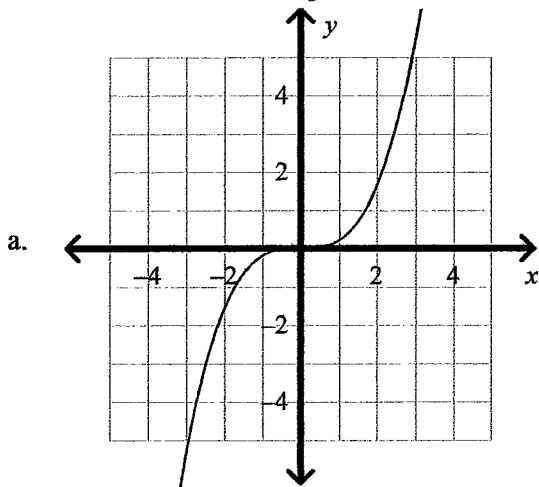
- _____ 59. $-2x^7 + 5x$

- The leading term is $-2x^7$. Since n is odd and a is negative, the end behavior is up and up.
- The leading term is $-2x^7$. Since n is odd and a is negative, the end behavior is down and up.
- The leading term is $-2x^7$. Since n is odd and a is negative, the end behavior is up and down.
- The leading term is $-2x^7$. Since n is odd and a is negative, the end behavior is down and down.

- _____ 60. $2x^7 + 6x^6 + 6x^5 - 5$

- The leading term is $2x^7$. Since n is odd and a is positive, the end behavior is up and down.
- The leading term is $2x^7$. Since n is odd and a is positive, the end behavior is down and down.
- The leading term is $2x^7$. Since n is odd and a is positive, the end behavior is down and up.
- The leading term is $2x^7$. Since n is odd and a is positive, the end behavior is up and up.

61. What is the graph of $y = \frac{1}{5}x^3$



Write the polynomial in factored form.

62. $x^3 - x^2 - 30x$

What are the zeros of the function? Graph the function.

63. $y = x(x + 5)(x + 3)$

What are the zeros of the function? What are their multiplicities?

_____ 64. $f(x) = x^4 + x^3 - 2x^2$

- a. the numbers 0 and 1 are zeros of multiplicity 2; the number -2 is a zero of multiplicity 1
- b. the numbers -1 and 2 are zeros of multiplicity 2; the number 0 is a zero of multiplicity 1
- c. the number 0 is a zero of multiplicity 2; the numbers -1 and 2 are zeros of multiplicity 1
- d. the number 0 is a zero of multiplicity 2; the numbers 1 and -2 are zeros of multiplicity 1

What is the relative maximum and minimum of the function?

65. $f(x) = x^3 + 3x^2 - 72x$

What are the real or imaginary solutions of each polynomial equation?

66. $x^4 - 41x^2 + 400 = 0$

Find the real solutions of the equation by graphing.

67. $16x^3 - 20x^2 + 6x = 0$

68. Divide $-2x^3 - x^2 + 3x - 3$ by $x - 2$.

69. Divide $19x^3 - 1304 + 22x$ by $(x - 4)$.

70. Use synthetic division to find $P(2)$ for $P(x) = x^4 - 8x^3 + 3x^2 + 4x - 8$.

