

1. Jasmine decides to put \$100 in a savings account each month. The account pays 3% annual interest, compounded monthly. How much money, S , will Jasmine have after one year?

1. $S = 100(1.03)^{12}$
2. $S = \frac{100 - 100(1.0025)^{12}}{1 - 1.0025}$
3. $S = 100(1.0025)^{12}$
4. $S = \frac{100 - 100(1.03)^{12}}{1 - 1.03}$

2. The solution to the equation $4x^2 + 98 = 0$ is

1. ± 7
2. $7i$
3. $\pm \frac{7\sqrt{2}}{2}$
4. $\pm \frac{7i\sqrt{2}}{2}$

3. The expression $6xi^3(-4xi + 5)$ is equivalent to

1. $2x - 5i$
2. $-24x^2 - 30xi$
3. $-24x^2 + 30x - i$
4. $26x - 24x^2i - 5i$

4. The method of completing the square was used to solve the equation $2x^2 - 12x + 6 = 0$. Which equation is a correct step when using this method?

1. $(x - 3)^2 = 6$
2. $(x - 3)^2 = -6$
3. $(x - 3)^2 = 3$
4. $(x - 3)^2 = -3$

5. Pedro and Bobby each own an ant farm. Pedro starts with 100 ants and says his farm is growing exponentially at a rate of 15% per month. Bobby starts with 350 ants and says his farm is steadily *decreasing* by 5 ants per month.

Assuming both boys are accurate in describing the population of their ant farms, after how many months will they both have approximately the same number of ants?

1. 7 3. 13
2. 8 4. 36

6. The solution to the equation $18x^2 - 24x + 87 = 0$ is

1. $-\frac{2}{3} \pm 6i\sqrt{158}$
2. $-\frac{2}{3} \pm \frac{1}{6}i\sqrt{158}$
3. $\frac{2}{3} \pm 6i\sqrt{158}$
4. $\frac{2}{3} \pm \frac{1}{6}i\sqrt{158}$

7. Suppose a company's revenue increased by 4.65% over the previous year. Assuming this trend continues, which expression could the company use to approximate the percent increase in revenue through a certain number of months, m ?

1. $(1.0038)^m$
2. $(1.0465)^{\frac{m}{12}}$
3. $(1.0038)^{\frac{m}{12}}$
4. $(1.0465)^m$

8. Which equation is equivalent to the following?

$$2x^2 - 12x + 2y^2 + 20y - 28 = 0$$

1. $2(x - 3)^2 + 2(y + 5)^2 = 44$
2. $2(x - 3)^2 + 2(y + 5)^2 = 60$
3. $2(x - 3)^2 + 2(y + 5)^2 = 62$
4. $2(x - 3)^2 + 2(y + 5)^2 = 96$

9. Find $f'(x)$ given that $f(x) = \frac{5}{4}x - 3$.

1. $f'(x) = \frac{4}{5}x + \frac{3}{5}$
2. $f'(x) = \frac{4}{5}x + \frac{4}{5}$
3. $f'(x) = \frac{4}{5}x + \frac{12}{5}$
4. $f'(x) = \frac{4}{5}x - \frac{3}{5}$

10. Find the solution set for the following equation.

$$\sqrt{3x+20} = 3x$$

1. $\left\{-\frac{4}{3}\right\}$
2. $\left\{\frac{4}{3}\right\}$
3. $\left\{\frac{5}{3}\right\}$
4. $\left\{\frac{4}{3}, \frac{5}{3}\right\}$

11. Which of the following represents $(-2 + ai)^2$ in simplest form, given that i is the imaginary unit?

1. $-a^2 + 4$
2. $-a^2 + 4ai + 4$
3. $a^2 + 4ai + 4$
4. $-a^2 - 4ai + 4$

12. Which of the following represents $(ai + 3)(ai - 6)$ in simplest form, given that i is the imaginary unit?

1. $a^2 - 3ai - 18$
2. $-a^2 + 3ai + 18$
3. $-a^2 - 3ai - 18$
4. $a^2 - 3ai + 18$

13. When $a > 0$ and c is a negative integer, the expression $(4a)^{\frac{c}{3}}$ is equivalent to

1. $(\sqrt[3]{4a})^c$
2. $(\sqrt[3]{4a^c})$
3. $\frac{1}{\sqrt[3]{4a^c}}$
4. $\frac{1}{(\sqrt[3]{4a})^c}$

14. The product of $\sqrt[3]{4m^2}$ and $\sqrt[3]{10m}$ expressed in simplest radical form is

1. $\sqrt[3]{40m^3}$
2. $2\sqrt[3]{5m^3}$
3. $m\sqrt[3]{40}$
4. $2m\sqrt[3]{5}$

15. The expression $\left(x^{\frac{1}{2}}y^{-\frac{2}{3}}\right)^{-6}$ is equivalent to

1. $\frac{y^4}{x^3}$
2. $\frac{x^3}{y^4}$
3. $\frac{1}{x^3y^4}$
4. x^3y^4

16. If the roots of the quadratic equation $ax^2 + bx + c = 0$ are real, irrational, and unequal, then the value of the discriminant is

1. equal to zero
2. less than zero
3. greater than zero and a perfect square
4. greater than zero and not a perfect square

17. If the roots of a quadratic equation are real, irrational, and unequal, the discriminant could have a value of

1. 1
2. 0
3. 8
4. -6

18. The expression $\frac{\sqrt{5}}{7-\sqrt{5}}$ is equivalent to

1. $\frac{7\sqrt{5}+5}{54}$
2. $\frac{7\sqrt{5}-5}{54}$
3. $\frac{7\sqrt{5}+5}{44}$
4. $\frac{7\sqrt{5}-5}{44}$

19. The expression $\frac{3}{4}\sqrt{-80}$ is equivalent to

1. $3i\sqrt{5}$
2. $2i\sqrt{15}$
3. $-3\sqrt{5}$
4. $-2\sqrt{15}$

20. The roots of the equation $4(x^2 - 1) = -3x$ are

1. imaginary
2. real, rational, equal
3. real, rational, unequal
4. real, irrational, unequal

21. The expression $\sqrt[3]{27a^{-6}b^3c^2}$ is equivalent to

1. $\frac{3bc^{\frac{2}{3}}}{a^2}$
2. $\frac{3b^9c^6}{a^{18}}$
3. $\frac{3b^6c^5}{a^3}$
4. $\frac{3b^3\sqrt{3c^2}}{a^2}$

22. Solve algebraically for all values of x , identifying the actual and extraneous solution.

$$\sqrt{-x+14} - 2x = 8$$

Answer:

Actual solution:

Extraneous solution:

23. Which expression is equivalent to $\frac{x^{-1}y^2}{x^2y^{-4}}$?

1. $\frac{x}{y^2}$
2. $\frac{x^3}{y^6}$
3. $\frac{y^2}{x}$
4. $\frac{y^6}{x^3}$

24. Select the common ratio and the 4th term of the geometric series: 9, -6, 4...

1. Common Ratio: $-\frac{3}{2}$; 4th Term: -13.5
2. Common Ratio: $-\frac{2}{3}$; 4th Term: $-2\frac{2}{3}$
3. Common Ratio: $-\frac{2}{3}$; 4th Term: $2\frac{2}{3}$
4. Common Ratio: $\frac{2}{3}$; 4th Term: $2\frac{2}{3}$

25. The 4th term in a geometric sequence is -15, the 5th term is 45, and the 6th term is -135. Find the sum of the first 7 terms.

1. -105
2. $-101\frac{1}{9}$
3. $303\frac{8}{9}$
4. 305

26. Solve $e^{4x} = 12$ algebraically for x , rounded to the nearest hundredth.

1. 1.09
2. 1.10
3. 0.62
4. 0.48

27. The domain of $f(x) = -\frac{3}{\sqrt{2-x}}$ is the set of all real numbers

1. greater than 2
2. less than 2
3. except 2
4. between -2 and 2

28. When $-3 - 2i$ is multiplied by its conjugate, the result is

1. -13 3. 5
 2. -5 4. 13

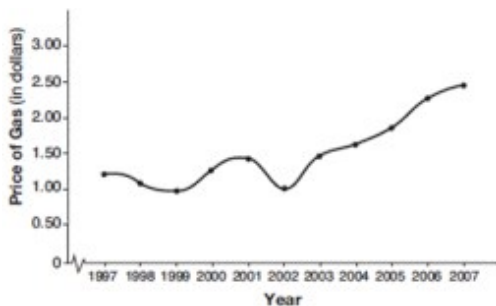
29. If $2x^3 = y$, then $\log y$ equals

1. $\log(2x) + \log 3$
 2. $3 \log(2x)$
 3. $3 \log 2 + 3 \log x$
 4. $\log 2 + 3 \log x$

30. A cliff diver on a Caribbean island jumps from a height of 105 feet, with an initial upward velocity of 5 feet per second. An equation that models the height, $h(t)$, above the water, in feet, of the diver in time elapsed, t , in seconds, is $h(t) = -16t^2 + 5t + 105$. How many seconds, to the nearest hundredth, does it take the diver to fall 45 feet below his starting point?

1. 1.45 3. 2.10
 2. 1.84 4. 2.72

31. The graph below shows the average price of gasoline, in dollars, for the years 1997 to 2007.



What is the approximate range of this graph?

1. $1997 \leq x \leq 2007$
 2. $1999 \leq x \leq 2007$
 3. $0.97 \leq y \leq 2.38$
 4. $1.27 \leq y \leq 2.38$

32. If $g(x) = \frac{1}{2}x + 8$ and $h(x) = \frac{1}{2}x - 2$, what is the value of $g(h(-8))$?

1. 0 3. 5
 2. 9 4. 4

33. The expression $\log 4m^2$ is equivalent to

1. $2(\log 4 + \log m)$ 3. $\log 4 + 2 \log m$
 2. $2 \log 4 + \log m$ 4. $\log 16 + 2 \log m$

34. The sum of the first eight terms of the series $3 - 12 + 48 - 192 + \dots$ is

1. $-13,107$ 3. $-39,321$
 2. $-21,845$ 4. $-65,535$

35. The expression $\log \frac{b^3}{\sqrt{a}}$ is equivalent to

1. $3b - \frac{1}{2}a$
 2. $\log 3b - \log \frac{1}{2}a$
 3. $3 \log b - \frac{1}{2} \log a$
 4. $3 \log b - 2 \log a$

36. If $f(x) = 4x - x^2$ and $g(x) = \frac{1}{x}$, then $(f \circ g)\left(\frac{1}{2}\right)$ is equal to

1. $\frac{4}{7}$
 2. -2
 3. $\frac{7}{2}$
 4. 4

37. What is the sum of the first 19 terms of the sequence $3, 10, 17, 24, 31, \dots$?

1. 1188 3. 1254
 2. 1197 4. 1292

38. Which of the following expressions is equivalent to $\sqrt[4]{648}$?

1. $6\sqrt[3]{3}$
 2. $18\sqrt{2}$
 3. $6\sqrt[4]{2}$
 4. $3\sqrt[4]{8}$

39. Which of the following expressions is equivalent to

$$\sqrt[3]{-750x^5y^4z^6}?$$

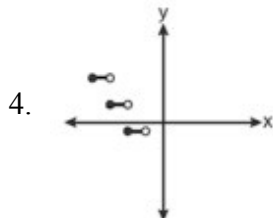
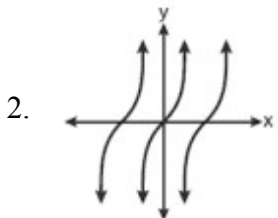
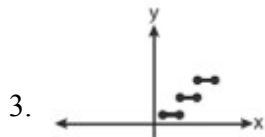
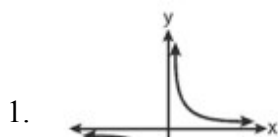
1. $-5x^2y^2z^3\sqrt[3]{30x}$
2. $5x^2y^2z^3\sqrt[3]{-6x}$
3. $-5xyz^3\sqrt[3]{6x^2y}$
4. $-5xyz^2\sqrt[3]{6x^2y}$

40. Which of the following expressions is equivalent to

$$\sqrt[5]{-64x^7y^{10}z^{15}}?$$

1. $-2xy^2z^3\sqrt[5]{2x^2z^3}$
2. $-8xy^2z^2\sqrt[5]{x^2z^3}$
3. $-2xy^2z^3\sqrt[5]{4x^3y^2z}$
4. $2xy^2z^2\sqrt[5]{-4x^2z^3}$

41. Which graph represents a relation that is *not* a function?



42. The value of x in the equation $4^{2x+5} = 8^{3x}$ is

1. 1
2. 3
3. 5
4. -10

43. Solve algebraically for x : $16^{2x+3} = 64^{x+2}$

Answer: $x =$

44. If a quadratic equation with real coefficients has a discriminant of **10**, then what type of roots does it have?

1. 2 real, rational roots
2. 2 real, irrational roots
3. 1 real, rational root
4. 2 imaginary roots

45. Describe the number and type of roots for the equation: $9x^2 + 16 = -24x$.

1. 2 real, rational roots
2. 2 real, irrational roots
3. 1 real, rational root
4. 2 imaginary roots

46. For what values of x is the function $f(x) = x^2 - 4x - 5$ increasing?

1. $-1 < x < 5$
2. $x > 2$
3. $x < -1$ or $x > 5$
4. $x < 2$

47. Simplify the expression: $(3\sqrt{7} - 2)(1 - \sqrt{7})$

1. $23 + 5\sqrt{7}$
2. $23 - 5\sqrt{7}$
3. $-23 + 5\sqrt{7}$
4. $-23 - 5\sqrt{7}$

Answer Key for Midterm 2018 Review

1. 2	17. 3	33. 3
2. 4	18. 3	34. 3
3. 2	19. 1	35. 3
4. 1	20. 4	36. 4
5. 2	21. 1	37. 3
6. 4	22. -2, -6.25	38. 4
7. 1	23. 4	39. 4
8. 4	24. 2	40. 1
9. 3	25. 3	41. 3
10. 3	26. 3	42. 2
11. 4	27. 2	43. 0
12. 3	28. 4	44. 2
13. 4	29. 4	45. 3
14. 4	30. 2	46. 2
15. 1	31. 3	47. 3
16. 4	32. 3	