

Algebra 2 Review Final Exam - Spring 2016

Indicate the answer choice that best completes the statement or answers the question.

Write the given equation in exponential form.

1. $\log_2 \frac{1}{8} = -3$

a. $2^{-3} = \frac{1}{8}$ b. $3^2 = 8$

c. $2^3 = 8$ d. $(-3)^2 = \frac{1}{8}$

Simplify the expression using long division.

2. $(8x^2 - 257x + 32) \div (x - 32)$

a. quotient $8x - 257$ and remainder 32 b. quotient $8x - 1$ and remainder 0

c. quotient $8x - 1$ and remainder -64 d. quotient $8x + 1$ and remainder 64

Find the inverse of the given function.

3. $f(x) = \frac{13}{4}x - 1$

a. $f^{-1}(x) = \frac{4x - 4}{13}$ b. $f^{-1}(x) = \frac{4x + 4}{13}$

c. $f^{-1}(x) = \frac{4}{13}x + 1$ d. $f^{-1}(x) = \frac{4}{13}x - 1$

Simplify the given expression.

4. $\frac{5x^2y^3}{2a^5b^4} \div \frac{41x^5y}{32a^7b^3}$

a. $\frac{80y^2a}{41x^3b}$ b. $\frac{80y^2a^2}{41x^3b}$

c. $\frac{80y^2a^2}{41x^3}$ d. $\frac{80ya^2}{41x^3b}$

5. $\frac{3p^4}{7q^5(r-8)^3} \cdot \frac{37q^2(r-8)}{60p^3}$

a. $\frac{37p(r-8)^2}{140q^3}$ b. $\frac{37p^2}{140q^3(r-8)^2}$

c. $\frac{37p}{140q^2(r-8)^2}$ d. $\frac{37p}{140q^3(r-8)^2}$

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6. $\frac{12x}{2y} \cdot \frac{3y^2}{24x^3}$

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

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

7. $\frac{3(a^2 + 5a + 6)}{5(a^2 - 196)} \div \frac{41(a + 3)}{70(a + 14)}$

a. $\frac{42(a + 3)(a - 2)}{41(a - 14)}$ b. $\frac{42(a + 3)(a + 2)}{41(a + 14)(a - 14)}$

c. $\frac{42(a + 2)}{41(a + 14)}$ d. $\frac{42(a + 2)}{41(a - 14)}$

8. $\frac{\frac{2x^2 - 2}{x}}{\frac{2(x^2 + 9)}{16x^2 - 29x}}$

a. $\frac{(x^2 - 1)(16x^2 - 29x)}{x(x^2 + 9)}$ b. $\frac{(x + 1)(x - 1)(16x - 29)}{(x^2 + 9)}$

c. $\frac{(x^2 - 9)}{(x^2 + 1)(16x - 29)}$ d. $\frac{(x^2 + 9)}{(x + 1)(x - 1)(16x - 29)}$

Simplify the given expression.

9. $(4x^2 + 11x + 20) + (3x^2 - 25x - 1)$

a. $7x^2 + 36x + 21$ b. $7x^2 + 14x + 19$

c. $7x^2 - 14x + 19$ d. $29x^2 - 14x + 19$

10. $(-2x^2 - 6x + 20) - (11x^2 + 24x - 8)$

a. $-13x^2 - 30x + 12$ b. $-13x^2 - 30x + 28$

c. $-13x^2 - 18x + 28$ d. $-13x^2 - 17x + 12$

11. $-4xy(4xy^3 - 7xy + 5y^2)$

a. $-16x^2y^4 - 7x^2y^2 + 5x^2y^3$ b. $-16x^2y^4 + 28xy + 20y^2$

c. $-16x^2y^4 + 28x^2y^2 - 20xy^3$ d. $-16x^2y^4 - 7xy + 5y^2$

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

12. $12 + 4e^{6x} = 27$
 a. 0.9159 b. 3.75
 c. 0.824 d. 0.2203

13. Find $(f \cdot g)(x)$ for the following functions.

$$f(x) = 10x^2 - 11x - 11$$

$$g(x) = 8x - 4$$

a. $80x^3 - 128x^2 + 44x - 132$ b. $80x^3 - 128x^2 - 44x + 44$
 c. $80x^3 - 128x^2 - 44x - 44$ d. $80x^3 + 40x^2 - 132x + 44$

Factor the polynomial completely.

14. $125x^3 + 8y^3$
 a. $(5x - 2y)(25x^2 - 10xy + 4y^2)$ b. $(5x + 2y)(25x^2 - 10xy + 4y^2)$
 c. $(5x - 2y)(25x^2 + 10xy + 4y^2)$ d. $(5x + 2y)(25x^2 + 4y^2)$

15. $8x^4y - 16x^2y^2$
 a. $8x^2y(x^2 - 2y)$ b. $8x^2(x^2y - 2y^2)$
 c. $x^2y(8x^2 - 16y)$ d. $8(x^4y - 2x^2y^2)$

16. $4x^2 - 11x + 6$
 a. $4x(x - 2) - 3(x - 2)$ b. $4x^2 - 7x - 4x + 6$
 c. $(4x - 3)(x - 2)$ d. $4x^2 - 8x - 3x + 6$

17. $38xy - 57y - 12x + 18$
 a. $19y(2x - 3) - 12x + 18$ b. $19y(2x - 3) - 6(2x - 3)$
 c. $(19y - 6)(2x - 3)$ d. $(38xy - 57y) - (12x - 18)$

Express the given logarithm in terms of common logarithms. Then approximate its value to four decimal places.

18. $\log_8 19$
 a. $\log\left(\frac{8}{19}\right); -0.3757$ b. $\log\left(\frac{19}{8}\right); 0.3757$
 c. $\frac{\log 8}{\log 19}; 0.7062$ d. $\frac{\log 19}{\log 8}; 1.416$

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Solve the given equation.

19. $2^{5n+2} = 16$

a. $n = 2$ b. $n = \frac{1}{5}$

c. $n = \frac{6}{5}$ d. $n = \frac{2}{5}$

Find the inverse of the given relation.

20. $\{(10, -10), (-2, 5), (10, -4)\}$

a. $\{(-10, 10), (5, -2), (-4, 10)\}$ b. $\{(10, -10), (5, -2), (-4, 10)\}$

c. $\{(-10, 10), (5, -2), (4, -10)\}$ d. $\{(-10, 10), (-5, 2), (-4, 10)\}$

21. $\{(7, -12), (3, 3), (12, -6), (18, -7)\}$

a. $\{(-12, 7), (-3, -3), (-6, 12), (-7, 18)\}$

b. $\{(-12, 7), (3, 3), (-6, -12), (-7, 18)\}$

c. $\{(-12, 7), (3, 3), (-6, 12), (-7, 18)\}$

d. $\{(-12, 7), (3, 3), (-6, 12), (-7, -18)\}$

22. Determine whether each pair of functions are inverse functions.

1) $f(x) = 10x - 6$, $g(x) = \frac{1}{10}(x + 6)$

2) $f(x) = 12x + 5$, $g(x) = 12x - 5$

a. Only 2 is an inverse function.

b. Both 1 and 2 are inverse functions.

c. Only 1 is an inverse function.

d. Neither 1 nor 2 is an inverse function.

23. Find $(f - g)(x)$ for the following functions.

$f(x) = 13x + 13$

$g(x) = -19x^2 + 9x + 25$

a. $19x^2 + 4x - 12$ b. $-19x^2 - 4x + 12$

c. $32x^2 - 9x - 12$ d. $-19x^2 - 4x - 12$

24. Solve $\log_2 x = 3$.

a. 6 b. 9

c. 8 d. 3

25. Solve $\log_4 b > 3$.

a. $b > 4$ b. $b > 64$

c. $b > 3^{-4}$ d. $b > 12$

Algebra 2 Review Final Exam - Spring 2016*Simplify the given expression. Assume that no variable equals 0.*

26.

$$\left(\frac{40x^{12}y^9}{20x^6y^{18}} \right)^2$$

a. $\frac{4x^{12}}{y^{18}}$ b. $\frac{4x^6}{y^9}$

c. $4x^{12}y^{-18}$ d. $2x^6y^{18}$

27. $(18x^{-13}y^3)(-5xy^7)$

a. $-90x^{-12}y^{10}$ b. $\frac{-90y^{10}}{x^{12}}$

c. $-90x^{10}y^{-78}$ d. $\frac{13y^{10}}{x^{12}}$

Simplify the given expression.

28. $\frac{1}{4x^2 - 49} + \frac{8}{2x + 7}$

a. $\frac{16x - 55}{(2x + 7)(2x - 7)}$ b. $\frac{9}{(4x^2 + 2x - 42)}$

c. $\frac{16x - 56}{(2x - 7)(2x + 7)}$ d. $\frac{16x + 55}{(2x + 7)(2x - 7)}$

29. $\frac{18}{y+2} - \frac{7y}{y^2-4}$

a. $\frac{11y - 36}{(y+2)(y^2-4)}$ b. $\frac{11y + 36}{(y+2)(y-2)}$

c. $\frac{18 - 7y}{(y+2)(y^2-4)}$ d. $\frac{11y - 36}{(y+2)(y-2)}$

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30. $\frac{1}{4x^2 - 9} + \frac{6}{2x + 3}$

a. $\frac{7}{(4x^2 + 2x - 6)}$ b. $\frac{12x - 18}{(2x - 3)(2x + 3)}$

c. $\frac{12x + 17}{(2x + 3)(2x - 3)}$ d. $\frac{12x - 17}{(2x + 3)(2x - 3)}$

31. $\frac{18}{xy^2} - \frac{7y^2}{8x^2}$

a. $\frac{144x - 7y^4}{8x^2y^2}$ b. $\frac{144x - 7xy^2}{8x^2y^2}$

c. $\frac{144x - 7xy^4}{8x^3y^2}$ d. $\frac{18 - 7y^2}{8x^2y^2}$

32. Use $\log_2 3 \approx 1.5850$ and $\log_2 2 = 1$ to approximate the value of the expression $\log_2 1,152$.

- a. 7 b. 10.170
c. 1,152 d. 1.946

33. Evaluate the expression $\ln e^8$.

- a. 8^e b. e^8
c. $\ln 8^e$ d. 8

Simplify.

34. $\sqrt{98} - \sqrt{252} + \sqrt{8} + \sqrt{63}$

- a. $9\sqrt{2} - 3\sqrt{7}$ b. $9\sqrt{2} + 3\sqrt{7}$
c. $3\sqrt{2} - 9\sqrt{7}$ d. $3\sqrt{2} + 9\sqrt{7}$

35. $\sqrt{98} + \sqrt{8} - \sqrt{18}$

- a. $6\sqrt{2}$ b. $12\sqrt{2}$
c. $6\sqrt{3}$ d. $8\sqrt{3}$

36. Find $[g \circ h](x)$ and $[h \circ g](x)$.

$g(x) = 6x$

$h(x) = -11x - 7$

a. $[g \circ h](x) = -66x^2 - 42x$ b. $[g \circ h](x) = -66x - 42$

$[h \circ g](x) = -66x^2 - 7x$ $[h \circ g](x) = -66x - 7$

c. $[g \circ h](x) = -66x + 42$ d. $[g \circ h](x) = -66x - 42$

$[h \circ g](x) = -66x + 7$ $[h \circ g](x) = -66x - 42$

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Solve the given inequality.

37. $10,000^{2n} < 1,000^{n+4}$

a. $n < \frac{4}{5}$ b. $n < \frac{12}{5}$

c. $n < \frac{4}{3}$ d. $n < 4$

Solve the given equation. Check your solution.

38. $\frac{6}{x+2} + \frac{3}{4} = \frac{9}{4}$

a. 3 b. $\frac{1}{2}$

c. 2 d. $\frac{1}{3}$

39. Find $p(-2)$ and $p(3)$ for the function $p(x) = 9x^4 + 9x^3 - 4x^2 + 6x + 10$.

a. 54; 964 b. -162; 478

c. 72; 952 d. 44; 954

40. Find $(f+g)(x)$ for the following functions.

$f(x) = 10x^2 + 3x + 2$

$g(x) = 10x + 8$

a. $20x^2 + 11x + 2$ b. $10x^2 + 13x + 2$

c. $20x^3 + 11x + 2$ d. $10x^2 + 13x + 10$

Write the given equation in logarithmic form.

41. $11^5 = 161,051$

a. $\log_5 161,051 = 11$ b. $\log_{11} 161,051 = 5$

c. $\log_6 161,051 = 5$ d. $\log_6 161,051 = 11$

Solve the given equation. If necessary, round to four decimal places.

42. $2^{8r} = 17$

a. 0.5109 b. 7.0591

c. 0.6931 d. 2.8332

43. $\log_2 6 + \log_2 a = \log_2 19$

a. 13 b. 0.32

c. 3.1667 d. 38

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Simplify the expression using synthetic division.

44. $(3x^3 - 64x^2 + 395x - 558) \div (x - 9)$
- quotient $3x^2 - 91x - 424$ and remainder 3,258
 - quotient $30x^2 + 206x - 2,249$ and remainder 19,683
 - quotient $3x^2 - 37x + 62$ and remainder 0
 - quotient $27x^2 + 179x + 2,006$ and remainder 17,496

45. Find $(f + g)(x)$ for the following functions.

$$f(x) = 18x^2 + 2x + 10$$

$$g(x) = 2x + 1$$

- $20x^3 + 3x + 10$
- $18x^2 + 4x + 11$
- $18x^2 + 4x + 10$
- $20x^2 + 3x + 10$

46. Find $(f - g)(x)$ for the following functions.

$$f(x) = -7x^3 + 22x^2 - 5$$

$$g(x) = 5x^2 + 16$$

- $-7x^3 + 17x^2 + 21$
- $-7x^3 + 17x^2 - 21$
- $-12x^3 + 22x^2 - 21$
- $7x^3 - 17x^2 + 11$

Evaluate the logarithmic expression.

47. $\log_9 59,049$

- 5
- 5^9
- 59,049
- $9^{59,049}$

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Answer Key

1. a

2. b

3. b

4. b

5. d

6. c

7. d

8. b

9. c

10. b

11. c

12. d

13. b

14. b

15. a

16. c

17. c

18. d

19. d

20. a

21. c

22. c

23. a

24. c

25. b

26. a

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27. b

28. a

29. d

30. d

31. a

32. b

33. d

34. a

35. a

36. b

37. b

38. c

39. a

40. d

41. b

42. a

43. c

44. c

45. b

46. b

47. a