Math 980 Modules 5 and 6 Objectives Review

Please study the following objectives from module five and six before taking your final exam. This review provides you with sample problems that correspond to the objectives given, however, **the problems on your final exam will not be exactly like the problems on this review.** You should go back and study your notes and look at all of the different types of problems that reinforce the objectives below. **Please also study both the modules 1 & 2 and the modules 3 & 4 objectives reviews as you prepare for the comprehensive final exam.** You can still watch the video lessons as another resource for preparing for your final exam.

Module 5 – Exponents, Radicals, and Polynomials

5.1 Use the Product Rule of Exponents

1) Simplify the expression:

$b \cdot b^{10} \cdot b^{2}$

2.) Simplify the expression:

$(2x^{4}y^{10}z^{8})(3x^{2}y^{9})$

5.1 Use the Power Rule of Exponents

3.) Simplify the expression:

$(4x^{8}y^{9}z^{10})^{3}$

4.) Simplify the expression:

$\left(\frac{x^{2}}{3}\right)^{3}$

5.1 Use the Quotient Rule of Exponents

5.) Simplify the expression:

$\frac{3^{7}}{3^{5}}$

6.) Simplify the expression:

$$\frac{21x^{11}y^{12}}{39x^{8}y^{7}}$$

5.1 Use the Negative Exponent Rules

7.) Simplify the expression:

$$4^{-1}$$

8.) Simplify the expression:

$$5y^{-15}$$

9.) Simplify the expression:

$$\left(\frac{1}{5}\right)^{-2}$$

10.) Simplify the expression:

$$\frac{1}{3^{-4}}$$

5.1 Use the Zero Power Rule of Exponents

11.) Simplify the expression:

$$52^{0}$$

12.) Simplify the expression:

$$(5x^{5})^{0}$$

5.2 Using Exponent Rules Together

13.) Simplify the expression:

$$(3a^{3}b^{2}c^{5})^{2}\ (2a^{5}b^{4}c^{2})^{3}$$

14.) Simplify the expression. Answer with only positive exponents.

$$\frac{(x^3y^3z^5)^6}{(x^5y^3z)^5}$$

15.) Simplify the expression. Answer with only positive exponents.

$$\frac{7a^3b^{-5}}{7^{-1}a^{-4}b^2}$$

16.) Simplify the expression. Answer with only positive exponents.

$$\frac{(3x^{-4}y^2)^{-3}}{(x^5y^5z^5)^{-3}}$$

5.3 Rewrite in Scientific Notation

17.) Rewrite this number in appropriate scientific notation:

59,000

18.) Rewrite this number in appropriate scientific notation:

0.0000649

5.3 Rewrite as a Whole Number or Decimal

19.) Rewrite this number as a whole number or decimal:

-1.85×10^{6}

20.) Rewrite this number as a whole number or decimal:

8.82×10^{-2}

5.3 Find the Product in Scientific Notation

21.) Multiply. Give the final answer in scientific notation.

$(4.7 \times 10^{8}) \times (1.5 \times 10^{-20})$

22.) Multiply. Give the final answer in scientific notation.

$(3.9 \times 10^{32}) \times (4.4 \times 10^{-40})$

5.3 Find the Quotient in Scientific Notation

23.) Divide. Give the final answer in scientific notation.

$$\frac{5.22 \times 10^{-9}}{2.9 \times 10^{-2}}$$

24.) Divide. Give the final answer in scientific notation.

$$\frac{2.64 \times 10^{3}}{5.5 \times 10^{-15}}$$

5.4 Estimate a Square Root

25.) The $\sqrt{78}$ is between which two whole numbers?

5.4 Estimate a Square Root with a Calculator

26.) Evaluate the $\sqrt{105}$ on your calculator. Round the answer to two decimal places.

5.4 Evaluate Square Roots

27.) Find the square root: $-\sqrt{256}$

28.) Find the square root: $\sqrt{-25}$

5.4 Evaluate Radicals with Higher Indices

29.) Evaluate: $\sqrt[4]{16}$

30.) Evaluate: $\sqrt[3]{-216}$

5.5 Simplify Square Roots

31.) Simplify: $\sqrt{45}$

32.) Simplify: $\sqrt{320}$

5.5 Simplify Radicals with Variables

33.) Simplify: $\sqrt{144p^9c^6}$

34.) Simplify: $\sqrt{108x^{15}y^{11}}$

5.5 Simplify Radicals with Coefficients

35.) Simplify: $5a\sqrt{125a^4}$

36.) Simplify: $-3\sqrt{27x^9}$

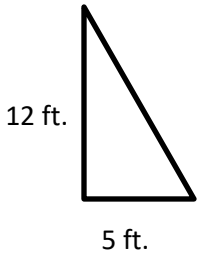
5.5 Simplify Higher Roots

37.) Simplify: $\sqrt[3]{-27b^{12}}$

38.) Simplify: $3\sqrt[4]{80}$

5.6 Use the Pythagorean Theorem

39.) Find the length of the hypotenuse of the triangle



40.) A 12 foot ladder is placed against a building. If the base of the ladder is 4 feet away from the building, how far up the building will the ladder reach? Round the answer to the nearest tenth.

5.7 Identify the Characteristics of a Polynomial

41.) Identify the leading coefficient, constant term, and degree of the polynomial:

$8x^3 + 2x^2 - 7x + 4$

5.7 Combine Like Terms

42.) Combine the like terms:

$7x^4 + 13x^3 + 14x^4 - 18x^3$

43.) Combine the like terms:

$-x^3 - 12x^2 - 9 - 12x^4 + 11x^3 + 9x + 4$

5.7 Multiply Polynomials

44.) Multiply: $2x^3 (4x^2 - 3x + 2)$

45.) Multiply: (a + 7) (a + 6)

46.) Multiply: (x – 3) (x – 5)

47.) Multiply: (a + 5b) (2a – 7b)

48.) Multiply: $(3a - 4)^2$

5.8 Factor the Greatest Common Factor

49.) Factor: $12x^6 + 24x^4 - 8x^3$

50.) Factor: $-35x^4 - 15x^3 - 5x^2$

5.8 Factor Trinomials

51.) Factor: $x^2 + 9x + 20$

52.) Factor: $x^2 - 9x + 18$

53.) Factor: $a^2 - 3a - 10$

54.) Factor: $w^2 + 8wy - 20y^2$

55.) Factor: $z^2 - 16z + 64$

56.) Factor: $x^3 + 3x^2 - 40x$

57.) Factor: x^2 – 7x + 30

Module 6 – Exponential and Logarithmic Functions

6.1 Evaluate an Exponential Function

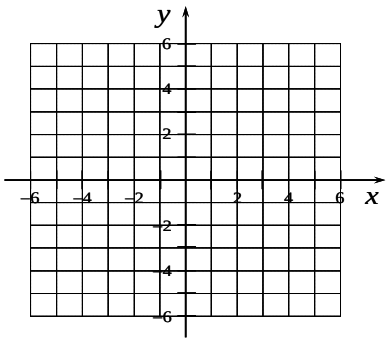
58.) For the function *f(x)* = 4^{x-3} calculate the following function values:

f(3) =

f(5) =

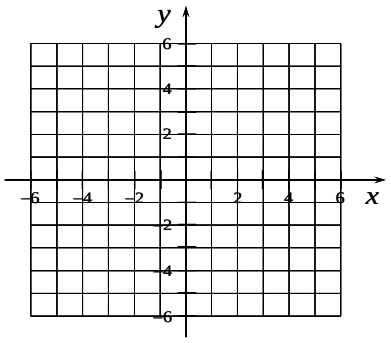
6.1 Graph an Exponential Function - Growth

59.) Graph the function *f(x)* = 3^x



6.1 Graph an Exponential Function – Decay

60.) Graph the function *f(x)* = $\left(\frac{1}{3}\right)^x$



6.2 Solve Applications Using Exponential Functions

61.) You deposit $400 in an account earning 5% interest compounded annually. How much will you have in the account in 15 years? Round the answer to the nearest cent.

Use the formula $A = P(1 + r)^t$

62.) A car purchased for $20,000 depreciates at a constant rate of 18%. What will be the value of the car in 8 years? Round the answer to the nearest cent.

Use the formula $V = P(1 – r)^t$

6.3 Convert Exponential Equations to Logarithmic Equations

63.) Write the equation in logarithmic form.

$2^7 = 128$

64.) Write the equation in logarithmic form.

$6561^{\frac{1}{4}} = 9$

65.) Write the equation in logarithmic form.

$8^{-4} = \frac{1}{4096}$

6.3 Convert Logarithmic Equations to Exponential Equations

66.) Write the equation in exponential form.

$\log_7(2401) = 4$

67.) Write the equation in exponential form.

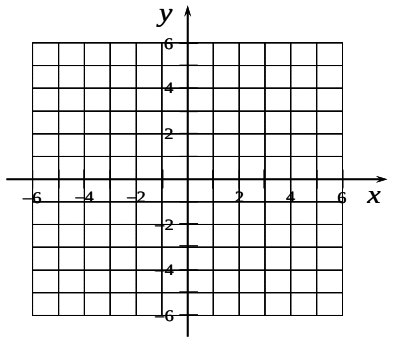
$\log_{216}(6) = \frac{1}{3}$

68.) Write the equation in exponential form.

$\log_4\left(\frac{1}{16}\right) = -2$

6.3 Graph Logarithmic Functions

69.) Graph $y = \log_4(x)$



6.4 Finding Common Logarithms

70.) Find the logarithm:

$\log\left(\frac{1}{100{,}000}\right)$

71.) Evaluate using your calculator. Round the answer to four decimal places.

log (55)

6.5 Evaluate Natural (base *e*) Logarithms

72.) Evaluate using your calculator. Round the answer to four decimal places.

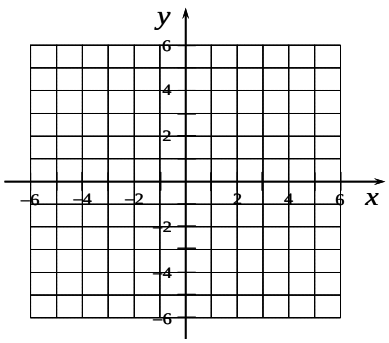
ln (40)

73.) Evaluate using your calculator. Round the answer to four decimal places.

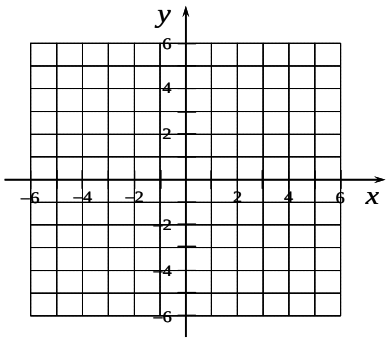
ln (0.005)

6.5 Graph Natural (base *e*) Logarithmic Functions

74.) Graph $f(x) = e^x$



75.) Graph *f(x)* = e^{2x}



6.6 Solve Exponential Equations

76.) Use the like bases property to solve the equation.

$5^{n} = 125$

77.) Solve for n. Round the answer to the nearest thousandth.

$2^{n} = 26$

78.) Solve for x. Round the answer to the nearest thousandth.

$e^{5x} = 25$

6.7 Solve Logarithmic Equations

79.) Solve for x in the equation below. It may be helpful to convert the equation to exponential form.

$\log_6 216 = x$

80.) Solve for z in the equation below. It may be helpful to convert the equation to exponential form.

$\log_8 z = -4$

81.) Solve for x in the equation below.

$\log_3 (3x - 1) = \log_3 (2x + 7)$

6.8 Solve Applications Using Logarithmic Functions

82.) Given the formula M(x) = $\log\left(\frac{x}{0.001}\right)$, compute the magnitude of an earthquake with a seismograph reading of 50,000 millimeters. Round the answer to the nearest tenth.

83.) The fox population in a certain region has a continuous growth rate of 7 percent per year. It is estimated that the population was 25,310 in the year 2010. Use the formula $P(t) = P_0 e^{rt}$, to find the estimated population in the year 2019. The answer must be an integer.

84.) The half-life of Radium-226 is 1590 years. If a sample contains 500 mg, how many mg will remain after 3000 years? Round the answer to the nearest whole mg.