These exercises are designed to work together with the mml homework for Unit I to prepare you for the Unit I test. Print out this review and bring it to class so that you can take notes on it and use it to help you do your mml homework.

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

9.1: **Use the Pythagorean theorem to find the missing side of the right triangle with legs a and b, and hypotenuse c. Approximate values to the nearest tenth when appropriate.**

Pythagorean Theorem: In a right triangle the sum of the squares of the length of the legs is equal to the square of the length of the hypotenuse. A right triangle has a 90° angle and a side opposite that connects the two legs:

The legs of a right triangle form the 90° (right) angle, and the hypotenuse is the side opposite that connects the other ends of the legs (like a diagonal in a rectangle)

The legs are generally referred to by the letters a and b while the hypotenuse is designated by the letter c.

Symbolically the Pythagorean theorem is stated: $a^2 + b^2 = c^2$

In order to find the square of the hypotenuse when you know the lengths of the legs, you square the leg lengths and add. To find the square of a leg when you know the hypotenuse and the other leg, you would need to subtract the known leg length squared from the square of the hypotneuse.

See on my website in the syllabus: LO.1, Pythagorean Theorem, Using Pythagorean Theorem

1) a = 9 mi, b = 12 mi

Since a & b represent the legs of the triangle (⌞), we need to find the hypotenuse (\)

We can use the formula to find the square of the length of the hypotenuse, but that is not the final goal. What do we need to do to the square of a number to find the actual value of the number?

Since a = 9, what is a^2 : $a^2 = 9^2 =$

Since b = 12, what is b^2: $= 12^2 =$

Add the two squared values togther to get c^2: $c^2 =$

Now what?

2) $a = 5$ cm, $b = 19$ cm

What is your goal? Find c, just like in #1 above.

3) $a = 3$ in., $b = 9$ in.

4) $a = 9$ yd, $c = 15$ yd

The goal in this item is to find b, a leg, not the hypotenuse. What do we need to do differently?

We can calculate the square of the hypotenuse, $c^2 = 15^2 =$. This number is a sum, but we need to find the part of the sum that is b^2, or, in other words, how do we find the part of c^2 that is NOT a^2?

Once we've calculated a^2, what do we do to find the actual value of a?

5) $a = 10$ ft, $c = 25$ ft

6) $b = 5$ m, $c = 20$ m

9.2: Provide an appropriate response. See Unit I Notes LO.2, Rules for exponents, Negative exponents.

7) Identify the base and exponent of 15^{10}.

Base is the repeated factor; the exponent counts how many times the factor appears in the product.

What number is being multiplied?

What number tells you how many factors of the base to use?

8) Evaluate 93^0.

Since an exponent tells us how many of the base to use in our product, what does an exponent of zero mean?

Since a facror is a number being multiplied, how do we UNDO multiplication (what is the reciprocal operation for multiplication)?

When you divide all of the factors of 93 out, what is the quotient?

9) Evaluate 2^{-1}.

Remember: a negative exponent means DIVIDE by the base instead of multiplying.

10) Write 6 squared, using symbols.
What is the base? What is the exponent? What is the exponentiated form?

11) Are the expressions 7^3 and 3^7 equal? Why or why not.

12) Are the expressions -9^2 and 9^2 equal? Why or why not.

13) $3 \times 10^{-2} =$ ____.

Evaluate the expression by hand.

14) $(-3)^2$

15) -6^5

16) 3^{-2}

17) $\left(\frac{1}{2}\right)^{-3}$

18) 15^0

19) $\left(\frac{5}{3}\right)^2$

20) $\frac{1}{5^{-2}}$

21) $\left(-\frac{1}{5}\right)^{-3}$

Use the product rule to simplify the expression. When you multiply two numbers with the SAME BASE, you ADD the exponents (WATCH OUT FOR THE SIGNS!!!!)

22) $4^{-3} \cdot 4^{8}$

23) $x^{-8} \cdot x^{3} \cdot x^{-6}$

24) $2x^{7} \cdot 7x^{-7}$

25) $4a^{5} \cdot 5a^{-3}$

26) $x^{8} \cdot x^{3} \cdot y^{4} \cdot y^{5}$

27) $-4m^{2} \cdot 5m^{2} \cdot z^{4} \cdot z^{2}$

Use the quotient rule to simplify the expression (subtract the bottom expoent from the top exponent!). Use positive exponents to write the answer (a negative exponent means that the base is on the WRONG side of the fraction bar, so shit the exponent form to the opposite side of the fraction and change the sign of the exponent).

28) $\frac{5^{-8}}{5^{-3}}$

29) $\frac{x^{4}}{x^{-7}}$

Do the constants first, then the variables.

30) $\frac{2a^{-2}b^{4}}{6a^{-7}b^{8}}$

31) $\frac{20x^{3}y^{-5}}{-4x^{5}y^{-8}}$

Use the power rules to simplify the expression (when you raise an number with an exponent to a power, you multiply the exponent times the power). Use positive exponents to write the answer.

32) $(3^{2})^{4}$

33) $(6x^{4})^{-2}$

34) $(x^{-2}y^{5})^{-2}$

35) $(-6x^{-5}y^{-4})^{-2}$

36) $\left(\frac{5x}{y^{3}}\right)^{-3}$

37) $\left(\frac{2x^{3}y^{-3}}{x^{-2}y^{3}}\right)^{-5}$

Use the rules of exponents to simplify the expression. Use positive exponents to write the answer.

38) $\frac{4x^{3}}{(ab)^{-1}}$

39) $\frac{8a^{-2}b^{7}}{2a^{-2}b^{4}}$

40) $\frac{10r^{-1}(st)^{2}}{20(rs)^{2}t^{-1}}$

41) $(-3x^{-4}y^{-6})^{2}$

42) $\frac{x^{7}(x^{6})^{-8}}{(x^{-4})^{-9}}$

43) $\left(\frac{2p^{-2}q}{2^{-1}m^{3}}\right)^{2}$

9.4 **Factor out the greatest common factor. See Notes for:** LO.4, Factor Pairs, Factoring Polynomials, Factoring Practice, Factoring Summary, Using the calculator to factor

44) $14y + 56$

45) $3x^{2} - 12x$

46) $25y^{3} + 100y^{2}$

47) $20x^{3} + 10x^{2} - 5x$

48) $54x^6 + 6x^4 + 12x^2$

49) $-36x^7y^9 + 18x^3y^7 + 27x^5y^3$

Use grouping to factor the polynomial.

50) $x^3 + 2x^2 + 6x + 12$

51) $x^3 + 7x^2 - 2x - 14$

52) $2y^3 - 10y^2 + 3y - 15$

53) $4x^3 + 20x^2 - 3x - 15$

54) $5y^3 - 15y^2 - 2y + 6$

55) $ax - bx + ay - by$

56) $z^4 - 5z^3 - 8z^2 + 40z$

Factor the expression completely.

57) $x^2 + 5x + 6$

58) $y^2 - 16y + 63$

59) $z^2 - 4z - 77$

Factor the expression completely, if possible. Items 61 – 64 are called the Difference of Square and ALWAYS factors to conjugate binomials.

60) $x^2 - 16$

(+)(−)

61) $121x^2 - 49$

(+)(−)

62) $81 - y^2$

(+)(−)

63) $169x^2 - 144y^2$

(+)(−)

Factor the expression completely, if possible. WATCH OUT!

64) $49s^2 + 4t^4$

Factor the expression completely, if possible. Perfect square trinomials factor to the square of a binomial.

65) $z^2 + 14z + 49$

$(\qquad\qquad)^2$

66) $49y^4 - 112y^3 + 64y^2$

$(\qquad\qquad)^2$

67) $a^3 + 18a^2b + 81ab^2$ Factor out GCF first.

$(\qquad\qquad)^2$

68) $25a^3b - 80a^2b + 64ab$ Factor out GCF first.

$(\qquad\qquad)^2$

Find the square roots of the number. Approximate the answer to the nearest hundredth whenever appropriate.

69) 36

70) $\frac{49}{289}$

71) 7

Find the principal square root (IS the POSITIVE base) of the number. Approximate the answer to the nearest hundredth whenever appropriate.

72) 196

73) $\frac{625}{169}$

74) 14

75) a^2, $a > 0$

76) $(ab)^2$, $ab < 0$ WATCH OUT! ab is a negative number.

Find the cube root of the number. Approximate the answer to the nearest hundredth whenever appropriate.

77) 1000

78) –125

79) $-\frac{1}{343}$

80) b^9

81) $125x^{15}$

9.7: **Simplify the expression. Assume that all variables are positive. See Notes for** LO.3, 4, Radicals Mind Map , Radical Review/Practice

82) $\sqrt{5} \cdot \sqrt{2}$

83) $\sqrt[3]{3} \cdot \sqrt[3]{-9}$

84) $\sqrt{\frac{125}{64}} \cdot \sqrt{\frac{5}{4}}$

85) $\sqrt{\frac{9}{z}} \cdot \sqrt{\frac{z}{11}}$

Simplify the expression. Assume that all variables are positive. IF possible, divide out any common factors of the top and bottom, then simplify the radicals.

86) $\frac{\sqrt{49}}{\sqrt{25}}$

87) $\frac{\sqrt{24}}{\sqrt{6}}$

88) $\frac{\sqrt[3]{48}}{\sqrt[3]{6}}$

89) $\frac{\sqrt{36xy^2}}{\sqrt{x}}$

90) $\sqrt[3]{\frac{x}{27}}$

Simplify the radical expression by factoring out the largest perfect nth power. Assume that all variables are positive.

91) $\sqrt{54}$

92) $\sqrt[3]{500}$

93) $\sqrt[4]{162}$

94) $\sqrt[3]{16}$

95) $\sqrt{125x^2}$

Answer Key
Testname: 1710 UN 1 REVIEW 14SP

1) 15 mi
2) 19.6 cm
3) 9.5 in.
4) 12 yd
5) 22.9 ft
6) 19.4 m
7) Base: 15, exponent: 10
8) 1
9) $\frac{1}{2}$
10) 6^2
11) No
12) No
13) 0.03
14) 9
15) –7776
16) $\frac{1}{9}$
17) 8
18) 1
19) $\frac{25}{9}$
20) 25
21) –125
22) 4^5
23) x^{-11}
24) 14
25) $20a^2$
26) $x^{11}y^9$
27) $-20m^4z^6$
28) $\frac{1}{5^5}$
29) x^{11}
30) $\frac{a^5}{3b^4}$
31) $-\frac{5y^3}{x^2}$
32) 6561
33) $\frac{1}{36x^8}$
34) $\frac{x^4}{y^{10}}$
35) $\frac{x^{10}y^8}{36}$
36) $\frac{y^9}{125x^3}$
37) $\frac{y^{30}}{32x^{25}}$
38) $4x^3ab$
39) $4b^3$
40) $\frac{t^3}{2r^3}$
41) $\frac{9}{x^8y^{12}}$
42) $\frac{1}{x^{77}}$
43) $\left(\frac{16q^2}{p^4m^6}\right)$
44) $14(y+4)$
45) $3x(x-4)$
46) $25y^2(y+4)$
47) $5x(4x^2+2x-1)$
48) $6x^2(9x^4+x^2+2)$
49) $-9x^3y^3(4x^4y^6-2y^4-3x^2)$
50) $(x^2+6)(x+2)$
51) $(x^2-2)(x+7)$
52) $(2y^2+3)(y-5)$
53) $(4x^2-3)(x+5)$
54) $(5y^2-2)(y-3)$
55) $(x+y)(a-b)$
56) $z(z^2-8)(z-5)$
57) $(x+2)(x+3)$
58) $(y-9)(y-7)$
59) $(z+7)(z-11)$
60) $(x+4)(x-4)$
61) $(11x+7)(11x-7)$
62) $(9+y)(9-y)$
63) $(13x+12y)(13x-12y)$
64) Does not factor
65) $(z+7)^2$
66) $y^2(7y-8)^2$
67) $a(a+9b)^2$
68) $ab(5a-8)^2$
69) –6, 6
70) $-\frac{7}{17}, \frac{7}{17}$
71) –2.65, 2.65
72) 14
73) $\frac{25}{13}$
74) 3.74
75) a
76) –ab
77) 10
78) –5
79) $-\frac{1}{7}$
80) b^3
81) $5x^5$
82) $\sqrt{10}$
83) –3
84) $\frac{25}{16}$
85) $\frac{3\sqrt{11}}{11}$
86) $\frac{7}{5}$
87) 2
88) 2
89) 6y
90) $\frac{\sqrt[3]{x}}{3}$
91) $3\sqrt{6}$
92) $5\sqrt[3]{4}$
93) $3\sqrt[4]{2}$
94) $2\sqrt[3]{2}$
95) $5x\sqrt{5}$