

Math 20 Final Exam Review

Part One: Do not use a calculator on any of the problems on Part One. Show all steps for each problem, and use algebra wherever possible.

Write in proper mathematics vocabulary each of the following.

1. The three properties for exponents
2. The three properties of addition
3. The four properties of multiplication
4. The distributive property of multiplication over addition
5. The rule for adding numbers with like signs
6. The rule for adding numbers with unlike sign
7. The rule for multiplying or dividing numbers with like signs
8. The rule for multiplying or dividing numbers with unlike signs

Simplify the following. You may not use a calculator for these problems. Do not round any answers. Show all steps in a logical and organized manner.

9. $(186)(49)$

21. $(3x-7)-(2x-10)$

10. $(7^2 - 1)(3 + 5 \cdot 2)$

22. $-15 - (-12)$

11. $7,052 - 3,967$

23. $3x(2x-1)$

12. $\frac{3}{5}(30)$

24. $3(-6) + 8(2-5)$

13. $-3 - 7 \cdot 2$

25. $(-2)^2 - 3 \cdot 4$

14. $\frac{5}{18} \div \frac{5}{16}$

26. $\frac{1}{3}(6x)$

15. $\frac{7}{12} - \frac{4}{15}$

27. $-\frac{3}{4}(12)$

16. $-\frac{2}{3} - \frac{5}{8}$

28. $\left(\frac{3}{8}\right)^2 \left(\frac{4}{3}\right)^2$

17. $20 \div 10 \cdot 2$

29. $\frac{23}{70} + \frac{29}{84}$

18. $-8 + 2(3-7)$

30. $\frac{x^2}{y} \div \frac{x}{y^3}$

19. $3(2x-7) + 4(3x-4)$

31. $\frac{8}{9} \div \frac{15}{36} \cdot \frac{3}{5}$

20. $(4x-3) + (8x-7)$

32. $27 \div \left(\frac{3}{4}\right)^2 + 48 \div \left(\frac{4}{5}\right)^2$

33. $\left(\frac{6}{7}\right) - \left(-\frac{9}{14}\right)$

42. $y^2 \cdot y^3$

34. $\frac{24}{35} \div \left(-\frac{18}{40}\right)$

43. $(y^2)^3$

35. $3.3 - 4(0.22)$

44. $\sqrt{128x^3}$

36. $\frac{3}{5}(0.9) + \frac{2}{3}(0.4)$

45. $3(2y^2)^3$

37. $(1.2)(38.9)$

46. $(3y^6)(2y^2)$

38. $(-29.07) \div (-3.8)$

47. $(3x)^2(2x)^3$

39. $42.056 \div (-2.8)$

48. $\frac{10x^2y}{5xy^2} \cdot \frac{2x}{y}$

40. $\frac{3}{5}(0.6) - \frac{2}{3}(0.15)$

49. $2x^2(3x^2 - 4)$

41. $\sqrt{75x^3y}$

50. $-3x(4x^2 + 7)$

51. $\sqrt{25} + \sqrt{36}$

55. -3^6

52. $\sqrt{9+16}$

56. $(-3)^4$

53. 12^0

57. $\frac{18}{0}$

54. $-\frac{4}{5} - \left(-\frac{11}{15}\right)$

58. $-(x^2 + x - 7)$

Use algebra to solve each of the following equations. Show all steps.

59. $3x - 10 = -7$

64. $3x + 15 = -3$

60. $\frac{3}{4}y = 9$

65. $\frac{3}{4}x - 2 = 7$

61. $4x + 5 = 2x - 1$

66. $\frac{7}{x} - \frac{2}{5} = 1$

62. $3(x - 2) = -18 + 9$

67. $\frac{x}{2} + \frac{4}{3} = -\frac{2}{3}$

63. $7x - 5 = -x - 5$

68. $\frac{1}{3}x - 2.99 = 1.02$

69. Write the given decimal as a fraction in lowest terms: 26.00522

70. Write the given fractions as a terminating or repeating decimal. Show your work. Do not round any answers.

a. $\frac{11}{14}$

c. $\frac{4}{99}$

b. $\frac{31}{64}$

d. $\frac{5}{8}$

71. Find the product of 8.47 and 21.9.

72. Find the value of $4x^2 - 2x + 7$ if $x = -2$

73. Find the difference of 2 and $\frac{1}{3}$

74. Find the quotient of -27 and $-\frac{3}{2}$

Solve the following word problems using algebra. Show the following three steps:

- 1. Identify the quantity that the variable stands for by writing "Let x =" and then naming the quantity that x stands for.**
- 2. Write an equation that models the problem.**
- 3. Solve the equation. Write your answer in a sentence using the proper units (if units are involved in the problem).**

75. The sum of a number and -8 is -22 . Find the number.

76. The product of a number and -3 is $\frac{27}{8}$. Find the number.

Part Two: You may use a calculator for this part of the final exam review. Be sure to show all steps and to use algebra. Give an exact answer (no rounding!) unless the directions ask you to round your answer.

Solve the following word problems using algebra. Show the following three steps:

- 1. Identify the quantity that the variable stands for by writing "Let $x =$ " and then naming the quantity that x stands for.**
- 2. Write an equation that models the problem.**
- 3. Solve the equation. Write your answer in a sentence using the proper units (if units are involved in the problem).**

77. A 16 oz. bottle of soda contains 230 calories. How many calories are contained in 22 oz. of soda. Round your answer to the nearest tenth of a calorie.
78. Terry has 19 more quarters than half-dollars. If he has \$23.50, how many quarters does he have?
79. What number is 20% of 130?

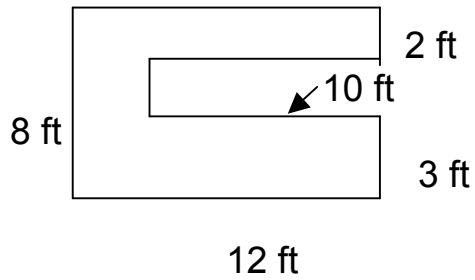
For each of the following geometry problems, show the following steps:

- Write the formula**
- Substitute in the known values, and**
- Solve for the requested quantity.**

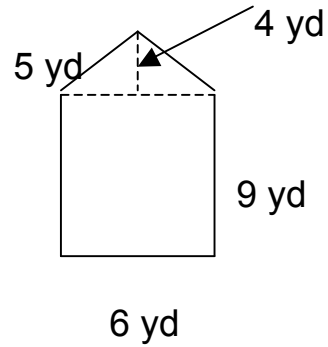
Use 3.14 for π , and round your answers to the nearest hundredth, if needed.

80. Find the circumference of a circle of diameter 12.21 ft

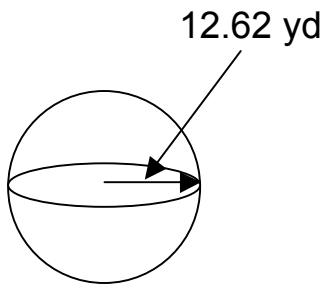
81. Find the area:



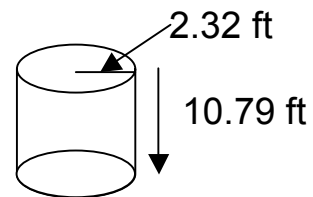
82. Find the area:



83. Find the volume:



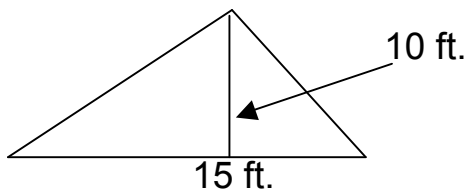
84. Find the volume:



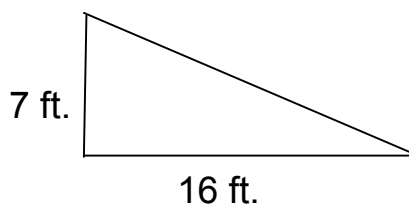
85. Find the area of a circle:
of radius 24.59 meters.

86. Find the perimeter of the
figure in #81.

87. Find the area:



88. Find the length of the hypotenuse of the given right triangle. Round
your answer to the nearest tenth of a foot.



Solve each of the following problems. You may use a calculator, but you must give an exact answer unless the directions indicate that you should give a rounded answer.

89. Solve the given equations. Show all steps.

a. $4a + 4.6 = 8a + 5.4$

b. $\frac{x}{8} = \frac{5}{4}$

90. Write the following ratio as a fraction in lowest terms: 0.4 to 1.8.

91. Write the given fractions as a percent:

a. $\frac{3}{5}$

b. $\frac{5}{8}$

c. $\frac{4}{7}$ (Round to the nearest tenth of a percent.)

92. Write the given percents as fractions in lowest terms.

a. 65%

b. 2.5%

ANSWER KEY:

1-8: Look in your text to find these properties.

9. 9,114

10. 624

11. 3,085

12. 18

13. -17

14. $\frac{8}{9}$

15. $\frac{19}{60}$

16. $-\frac{31}{24}$ or $-1\frac{7}{24}$

17. 4

18. -16

19. $18x - 37$

20. $12x - 10$

21. $x + 3$

22. -3

23. $6x^2 - 3x$

24. -42

25. -8

26. $2x$

27. -9

28. $\frac{1}{4}$

29. $\frac{283}{420}$

30. xy^2

31. $\frac{32}{25}$

32. 123

33. $\frac{3}{2}$ or $1\frac{1}{2}$

34. $-\frac{32}{21}$

35. 2.42

36. $\frac{121}{150}$

37. 46.68

38. 7.65

39. -15.02

40. .26

41. $5x\sqrt{3xy}$

42. y^5

43. y^6

44. $8x\sqrt{2x}$

45. $24y^6$

46. $6y^8$

47. $18x^5$

48. $\frac{4x^2}{y^2}$

49. $6x^4 - 8x^2$

50. $-12x^3 - 21x$

51. $5+6 = 11$

52. $\sqrt{25} = 5$

53. 1

54. $-\frac{1}{15}$

55. -729

56. 81

57. *undefined*

58. $-x^2 - x + 7$

59. $\{1\}$

60. $\{12\}$

61. $\{-3\}$

62. $\{-1\}$

63. $\{0\}$

64. $\{-6\}$

65. $\{12\}$

66. $\{5\}$

67. $\{-4\}$

68. $\{12.03\}$

69. $26\frac{261}{50000}$

70a. $\overline{0.7857142}$

70b. 0.484375

70c. $0.\overline{04}$

70d. 0.625

71. 185.493

72. 27

73. $\frac{5}{3} = 1\frac{2}{3}$

74. 18

75. (Identify the variable) Let x be the unknown number.

$$\text{(Eqn)} \quad x + (-8) = -22$$

$$\text{(Ans)} \quad x = -14$$

The number is -14 .

76. (Identify the variable) Let x be the unknown number.

$$\text{(Eqn)} \quad x(-3) = \frac{27}{8}$$

$$\text{(Ans)} \quad x = -\frac{9}{8}$$

The number is $-\frac{9}{8}$.

77. (Identify the variable) Let x be the number of calories in 22oz of soda.

$$\text{(Eqn)} \quad \frac{230}{16} = \frac{x}{22}$$

$$\text{(Ans)} \quad x = 313.6$$

There are 313.6 calories in 22 oz. of soda..

	# coins	value
half dollars	x	$.5x$
quarters	$x + 19$	$.25(x+17)$

$$\text{(Eqn)} \quad 5x + .25(x + 19) = \$23.50$$

(Ans) 25 half dollars and
44 quarters

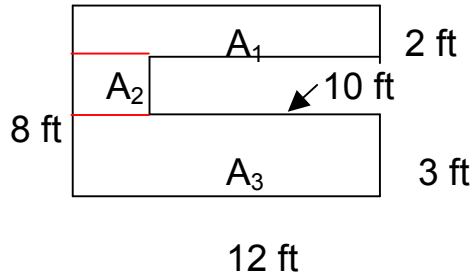
79. The number is 26.

$$80. \quad C = \pi d$$

$$C = (3.14)(12.21)$$

$$C = 38.34 \text{ ft.}$$

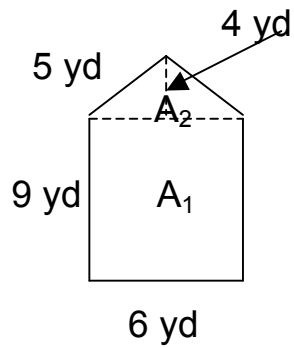
81.



$$\begin{aligned}A_1 &= lw \\ A_1 &= (12)(2) \\ A_1 &= 24 \\ A_2 &= lw \\ A_2 &= (3)(2) \\ A_2 &= 6 \\ A_3 &= lw \\ A_3 &= (12)(3) \\ A_3 &= 36\end{aligned}$$

$$A = A_1 + A_2 + A_3 = 24 + 6 + 36 = 66 \text{ ft}^2$$

82.



$$A_2 = \frac{1}{2}bh$$

$$A_2 = \frac{1}{2}(6)(4)$$

$$A_2 = 12 \text{ ft}^2$$

$$A_1 = lw$$

$$A_1 = (9)(6)$$

$$A_1 = 54 \text{ yd}^2$$

$$A = A_1 + A_2$$

$$A = 12 + 54 = 66 \text{ yd}^2$$

83. Volume of a sphere

$$V = \frac{4}{3} \pi r^3$$

$$V = \frac{4}{3} (3.14)(12.62)^3$$

$$V = 8414.85 \text{ yd}^3$$

84. Volume of a right circular cylinder

$$V = \pi r^2 h$$

$$V = (3.14)(2.32)^2 (10.79)$$

$$V = 182.36 \text{ ft}^3$$

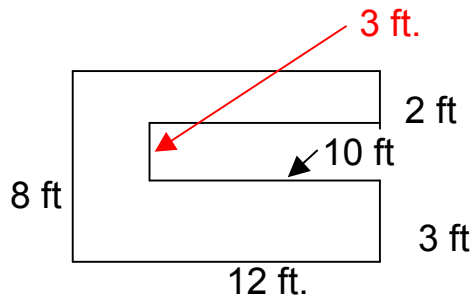
85. Area of circle:

$$A = \pi r^2$$

$$A = (3.14)(24.59)^2$$

$$A = 1898.66 \text{ m}^2$$

86. Perimeter of a composite figure. One side was not given in the original problem. I have calculated the length of that side and typed it in red.



$$P = a + b + c + d + e + f + g + h \text{ (There are eight sides.)}$$

$$P = 12 + 3 + 10 + 3 + 10 + 2 + 12 + 8$$

$$P = 60 \text{ ft.}$$

87. Area of a triangle.

$$A = \frac{1}{2} bh$$

$$A = \frac{1}{2} \bullet 15 \bullet 10$$

$$A = 75 \text{ ft}^2$$

88. {17.46 ft.}

89a. {-0.3}

89b. {10}

90. $\frac{2}{9}$

91a. 60%

91b. 62.5%

91c. 57.1%

92a. $\frac{13}{20}$

92b. $\frac{1}{40}$