

Cumulative Math Review

Math 02: Pre-algebra

- operations with fractions, integers, and decimals
- positive integer exponents, square roots, and scientific notation
- ratios and proportions
- percentages
- mean, median, and mode
- converting between units

Math 03/04: Algebra I & II

- setting up equations based on word problems
- linear equations in one variable
- solving percentage problems
- uniform motion problems
- geometry: area, volume, circumference, and perimeter
- geometry: finding the equation of a line
- basic polynomial operations
- factoring polynomials
- operations with exponents and radicals
- rational expressions
- linear equations in two variables

Math 02 Problems:

Evaluate the following:

- | | | |
|----------------------|-----------------------------|--|
| 1. $-3 + 5$ | 5. $140 \div 7$ | 9. $7^2 + 20 \bullet 4 - (28 + 9 \bullet 2)$ |
| 2. $7 - 15$ | 6. $-2 \times 5 + 3^3$ | 10. $(32 - 27)^3 + (19 + 1)^3$ |
| 3. $72 - 86 + 14$ | 7. $-3 + 8 \div 4 \times 2$ | 11. $3 + -9 \div 3 + 2^2$ |
| 4. $-84 - (-9) + -8$ | 8. $42x - 6 - 4x + 20$ | |

Solve the following:

- | | |
|-------------------------|--|
| 12. $9 + x = 17$ | 17. $5y + 3 = 2y + 15$ |
| 13. $x + 17 = -27$ | 18. $6 - 2(3x - 1) = 2$ |
| 14. $2x = 16$ | 19. $\frac{2}{3} + \frac{1}{4}x = \frac{1}{3}$ |
| 15. $\frac{x}{4} = -12$ | |
| 16. $4x + 3x = 42$ | |

Factor the following numbers into prime numbers:

- | | | |
|--------|--------|--------|
| 20. 24 | 21. 99 | 22. 11 |
|--------|--------|--------|

Change to a mixed number or improper fraction:

23. $\frac{67}{5}$

25. $\frac{125}{25}$

27. $14\frac{5}{9}$

24. $\frac{-144}{15}$

26. $7\frac{3}{4}$

28. $-7\frac{3}{7}$

Simplify the following fractions:

29. $\frac{18}{27}$

31. $\frac{11}{17}$

33. $\frac{13}{169}$

30. $\frac{125}{55}$

32. $\frac{14}{150}$

34. $\frac{3}{256}$

Find the LCM:

35. 14, 7

37. 8, 10

39. 35, 7, 10

36. 32, 24

38. -12, 9

40. 9, 11, 99

Perform the indicated operation:

41. $\frac{6}{7} + \frac{5}{7}$

43. $\frac{5}{8} * \frac{3}{4}$

45. $\frac{12}{4} - \frac{-7}{5}$

42. $\frac{12}{7} - \frac{15}{6}$

44. $\frac{18}{3} \div \frac{-3}{9}$

46. $\frac{1}{9} \div \frac{2}{3}$

Round the following numbers to the tens place and to the nearest hundredths:

47. 5.756

49. -90.005

51. -85.382

48. 13.574

50. 27.342

52. -1568.198

Convert each fraction into a decimal:

53. $\frac{1}{3}$

55. $\frac{5}{10}$

57. $\frac{15}{1000}$

54. $\frac{7}{8}$

56. $\frac{19}{27}$

58. $\frac{562}{100}$

Perform the indicated operation. (Round to thousandths if non-repeating number.):

59. $1.25 + 15.84$

62. $-12.365 + 9.2$

65. $43.3 \div 4.4$

60. -6×5.25

63. $21.93 \div 3$

66. $2.3 \div 0.8$

61. $15.22 - 5.759$

64. 12.25×5.30

67. 1.2×0.23

Solve the following proportions:

68. $\frac{8}{9} = \frac{x}{15}$

69. $\frac{12}{x} = \frac{24}{3}$

70. $\frac{5x}{125} = \frac{20}{330}$

Write each percent as a decimal and each decimal as a percent:

71. 15%

73. 0.67%

75. 0.68

72. 2.5

74. 1

76. 175%

Convert the following units:

77. 17 miles = _____ km

78. 24 inches = _____ cm

79. 1.586 m = _____ feet

American

Metric

1 inch

2.540 cm

1 foot

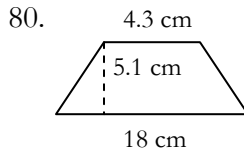
0.305 m

1 mile

1.609 km



What is the area of the following object?



Find the mean, median, and mode for the following set of numbers:

81. 2,6,7,5,9,4,2,3,4,2,6,8,9

State whether the following statements are true or false:

82. $|5| > |-9|$

83. $-5 < 2$

84. $-8 > -2$

85. $\frac{2}{5} < \frac{1}{3}$

86. Maria drives her car for 75 miles and uses 2.5 gallon of gas. How many miles could she drive on one gallon of gas?

87. A store sells rice at a rate of 79 cents per ounce. How much would 4 pounds of rice cost? (1 pound = 16 ounces).

88. If the Thanksgiving turkey takes 6.25 hours to cook and the instructions say to cook the turkey 15 minutes for each pound, how much does the turkey weigh?

89. Cat food is sold in three sizes: a 10 pound bag, a 15 pound bag, and a 20 pound bag. The 10 pound bag costs \$10.75, the 15 pound bag costs \$14.55, and the 20 pound bag costs \$16.99. Which is the best value?

90. What number is 27% of 175?

91. 3% of 48 is what number?

92. 15 is what percent of 75?

93. A rectangular field requires 500 feet of fence to enclose it. The length of the field is twice the width. What is the width of the field?

94. Two triangles are similar. Triangle A has sides measuring 3, 4, and 5. The shortest side on triangle B measures 6. What are the lengths of the other two sides on triangle B?

Math 03/04 Problems:

1. Translate into a variable expression: twenty more than a number.
2. Translate into a variable expression: ten times the difference between a number and fifty.
3. Translate into a variable expression: the product of two-thirds and the sum of a number and seven.
4. Translate into a variable expression: twice the sum of six times a number and seven.
5. Solve and check: $x+5=7$
6. Solve and check: $z + 9 = 2$
7. Solve and check: $x - \frac{1}{2} = \frac{1}{2}$
8. Solve and check: $-7 = -2 + x$
9. What is 250% of 12?
10. Find 15.4% of 50.
11. 12% of what is 48?
12. 12 is what percent of 50?
13. Jack leaves home at 9:00 A.M. and drives to work, arriving at 9:45 A.M. If the distance between home and work is 27 mi, what is Jack's average rate of speed?
14. Two runners, starting at the same time, run towards each other from opposite ends of an 8-mile trail. One runner is running at a rate of 5 mph, and the other is running at a rate of 7 mph. How long after they start will the two runners meet?
15. Solve and check: $3y - 5 = 3 - 2y$
16. Solve and check: $3(x - 4) = -5(6 - x)$
17. Solve and check: $5x - 8 < -3$
18. Solve and check: $|5x + 8| = 0$
19. Find the volume of a rectangular solid with a length of 6.5 ft, a width of 2 ft, and a height of 3 ft.

20. The height of a triangle is 7 cm. The area of a triangle is 28 cm^2 . Find the length of the base of the triangle.
21. The length of Sue's lawn is 56 ft. The width is 48 ft. How many feet of fence will she need to create a pen for her dogs?
22. Are the lines $x - 4y = 3$ and $4x + y = 8$ perpendicular?
23. Are the lines $2x + 3y = 2$ and $2x + 3y = -4$ parallel?
24. Find the equation of the line that contains the point $(-2, 3)$ and is parallel to the line $y = -4x + 3$.
25. Find the slope of the line that contains the ordered pairs $(3, -2)$ and $(-1, 2)$.
26. A rowboat team traveled with the current 36 mi in 2 hours. Coming back against the current, it took 3 hours to cover the same distance. Find the rate of the rowers in calm water and the rate of the current.
27. A turboprop plane flying with the wind flew 800 miles in 4 hours. Flying against the wind, the plane required 5 hours to travel the same distance. Find the rate of the plane in calm air and the rate of the wind.
28. Allen buys 16 yd of nylon carpet and 20 yd of wool carpet for \$1840. A second purchase, at the same prices, includes 18 yd of nylon carpet and 25 yd of wool carpet for \$2200. Find the cost per yard of the wool carpet.
29. Sandy has a total of \$25,000 deposited in three different accounts. The three accounts earn annual interest rates of 8%, 6%, and 4%. The amount she deposited in the 8% account is twice the amount in the 6% account. If she earns a total annual interest of \$1,520, how much money is deposited in each account?
30. Solve by substitution: $2x - 6y = 15$; $x = 4y + 8$
31. Solve by graphing: $x + y = 3$; $3x - 2y = -6$
32. Solve by addition: $3x + y = 4$; $x + y = 2$
33. Solve by addition: $2x + y - z = 5$; $x + 3y + z = 14$; $3x - y + 2z = 1$
34. Simplify: $(-3x^2y^3)^4$
35. Simplify: $(2xy)(-3x^2yz)(x^2y^3z^3)$

36. Simplify: $\left(\frac{12x^3y^2z}{18xy^3z^4}\right)^4$
37. Simplify and write in decimal notation: $\frac{(3.2 \times 10^{-11})(2.9 \times 10^{15})}{8.1 \times 10^{-3}}$
38. Add: $(12y^2 + 17y - 4) + (9y^2 - 13y + 3)$
39. Simplify: $(5x^2 - 8xy + 2y^2) - (x^2 - 3y^2)$
40. Multiply: $(5x^2yz^4)(2xy^3z^{-1})(7x^{-2}y^{-2}z^3)$
41. Divide: $(7 - x - x^2) \div (x + 3)$
42. Factor: $x^2 - 13x + 30$
43. Factor: $14y^9 - 49y^6 + 7y^3$
44. Factor: $x^2 - 25$
45. Factor: $8x^3 - 27y^3$
46. Factor: $21ax - 35bx - 10by + 6ay$
47. A small air conditioner can cool a room 5° in 75 min. A larger air conditioner can cool the room 5° in 50 min. How long would it take to cool the room 5° with both air conditioners working together?
48. Jane traveled 1080 mi by jet and then an additional 180 mi by helicopter. The rate of the jet was four times the rate of the helicopter. The entire trip took a total of 5 hours. Find the rate of the jet.
49. The distance (s) a ball will roll down an inclined plane is directly proportional to the square of the time (t). If the ball rolls 6 ft in 1 s, how far will it roll in 3 s?
50. Divide: $\frac{20x^2 - 45x}{6x^3 + 4x^2} \div \frac{40x^3 - 90x^2}{12x^2 + 8x}$
51. Solve: $\frac{2x}{x+4} = \frac{3}{x-1}$
52. Simplify: $\sqrt[3]{-64x^9y^{12}}$
53. Simplify: $2x\sqrt{8xy^2} - 3y\sqrt{32x^3} + \sqrt{4x^3y^3}$

54. Simplify: $(\sqrt{x} - 3)^2$

55. Simplify: $\frac{2-3\sqrt{5}}{1-\sqrt{5}}$

56. Simplify: $\sqrt{-3}\sqrt{-6}$

57. Simplify: $\sqrt{-2}(\sqrt{8} + \sqrt{-2})$

58. Solve by completing the square: $x^2 - 2x + 2 = 0$

59. Solve by using the quadratic formula: $x^2 - 4x + 13 = 0$

60. Solve: $\sqrt{3x+3} = x+1$

Math 02 Solutions:

- | | | |
|---------------------------------------|---------------------------|-----------------------|
| 1. 2 | 41. $\frac{11}{7}$ | median: 5 |
| 2. -8 | 42. $\frac{-11}{14}$ | mode: 2 |
| 3. 0 | 43. $\frac{15}{32}$ | 82. False |
| 4. -83 | 44. -18 | 83. True |
| 5. 20 | 45. $\frac{22}{5}$ | 84. False |
| 6. 17 | 46. $\frac{1}{6}$ | 85. False |
| 7. 1 | 47. 10, 5.76 | 86. 30 miles |
| 8. $38x + 14$ | 48. 10, 13.57 | 87. \$50.56 |
| 9. 83 | 49. -90, -90.01 | 88. 25 lb. |
| 10. 8125 | 50. 30, 27.34 | 89. 20 lb. bag |
| 11. 4 | 51. -90, -85.38 | 90. 47.25 |
| 12. 8 | 52. -1570, -1568.20 | 91. 1.44 |
| 13. -44 | 53. $0.\bar{3}$ | 92. 20% |
| 14. 8 | 54. 0.875 | 93. $83.\bar{3}$ feet |
| 15. -48 | 55. 0.5 | 94. 8 and 10 |
| 16. 6 | 56. $0.\overline{703}$ | |
| 17. 4 | 57. 0.015 | |
| 18. 1 | 58. 5.62 | |
| 19. $\frac{-4}{3}$ | 59. 17.09 | |
| 20. $2 \bullet 2 \bullet 2 \bullet 3$ | 60. -31.5 | |
| 21. $3 \bullet 3 \bullet 11$ | 61. 9.461 | |
| 22. 11 | 62. -3.165 | |
| 23. $13\frac{2}{5}$ | 63. 7.31 | |
| 24. $-9\frac{3}{5}$ | 64. 64.925 | |
| 25. 5 | 65. 9.841 | |
| 26. $\frac{31}{4}$ | 66. 2.875 | |
| 27. $\frac{131}{9}$ | 67. 0.276 | |
| 28. $\frac{-52}{7}$ | 68. $13.\bar{3}$ | |
| 29. $\frac{2}{3}$ | 69. $1.\bar{5}$ | |
| 30. $\frac{25}{11}$ | 70. $1.\bar{51}$ | |
| 31. $\frac{11}{17}$ | 71. 0.15 | |
| 32. $\frac{7}{75}$ | 72. 250% | |
| 33. $\frac{1}{13}$ | 73. 0.0067 | |
| 34. $\frac{3}{256}$ | 74. 100% | |
| 35. 14 | 75. 68% | |
| 36. 96 | 76. 1.75 | |
| 37. 40 | 77. 27.353 km | |
| 38. 36 | 78. 60.96 cm | |
| 39. 70 | 79. 5.2 feet | |
| 40. 99 | 80. 56.865 cm^2 | |
| | 81. mean: 5.2 | |

Math 03/04 Solutions:

1. $x + 20$
2. $10(n - 50)$
3. $\frac{2}{3}(x + 7)$
4. $2(6x + 7)$
5. 2
6. -7
7. 1
8. -5
9. 30
10. 7.7
11. 400
12. 24%
13. 36 mph
14. 40 min
15. $\frac{8}{5}$
16. 9
17. $\{x \mid x < 1\}$
18. $-\frac{8}{5}$
19. 39 ft^3
20. 8 cm
21. 208 ft
22. yes
23. yes
24. $y = -4x - 5$
25. -1
26. Rowers: 15 mph
Current: 3 mph
27. Plane: 180 mph
Wind: 20 mph
28. \$52/yd
29. 8%: \$10,400
6%: \$5,200
4%: \$9,400
30. $(6, -\frac{1}{2})$
31. $(0, 3)$
32. $(1, 1)$
33. 1, 4, 1)
34. $81x^8y^{12}$
35. $-6x^5y^5z^4$
36. $\frac{16x^8}{18y^4z^{12}}$
37. 11,456,790
38. $21y^2 + 4y - 1$
39. $4x^2 - 8xy + 5y^2$
40. $70xy^2z^6$
41. $-x + 2 + \frac{1}{x+3}$
42. $(x - 3)(x - 10)$
43. $7y^3(2y^6 - 7y^3 + 1)$
44. $(x + 5)(x - 5)$
45. $(2x - 3y)(4x^2 + 6xy + 9y^2)$
46. $(3a - 5b)(7x + 2y)$
47. 30 min.
48. 360 mph
49. 54 ft
50. $\frac{1}{x^2}$
51. $-\frac{3}{2}, 4$
52. $-4x^3y^4$
53. $-8xy\sqrt{2x} + 2xy\sqrt{xy}$
54. $x - 6\sqrt{x} + 9$
55. $\frac{13+\sqrt{5}}{4}$
56. $-3\sqrt{2}$
57. $-2 + 4i$
58. $1 \pm i$
59. $2 \pm 3i$
60. 2 and -1