Algebra A/B MAT 035

Review for Final Exam

Computation:

Evaluate the following expressions:

1. \(5 - 7 + (-8) - (-3) - 2\)
2. \(-5 (-3) (2) (-5)\)
3. \(\frac{2 (-5)(-3)}{-3}\)
4. \(|3 - 7| - |-6| + |11|\)
5. \(11 - 2 \cdot 23 + 24\)
6. \(-\frac{3(2)-4}{-3(5)(2)}\)
7. \((14-3) (3-7) + 2 (3-9)\)
8. \(7-2[6 - 7(2 - 5)]\)
9. \(20 - 12\div2-3 \cdot |-3|\)
10. \(-8 [ -4 - 6 (4 - 7)]\)
11. \(12 - 4[7 - 3(6 - 2)]\)
12. \(\frac{6^2 - 4[7 + 2(1 - 5)]}{2(-5)}\)

Simplify the following:

13. \(9 x^3 ( -7x^7)\)
14. \(-2x^3y^3(-5xy^2)(-x^3y)\)
15. \((-8a^5c^6)^2\)
16. \(-5^2 + (-3)^3 - (-2)^2\)
17. \((x+2)(x^2 - x + 3)\)
18. \((x - 12y)(x + 3y)\)
19. \(x^2 - 3^2 - (x+3)^2\)

Evaluate the following:

20. \(a^2 - 3ab + 3b^2\) for \(a= -3\) and \(b= -2\)

21. \(3x^2 - y^2z\) for \(x= -1, y= -2, z= -3\)
22. \(\frac{2x^2y}{3x-y^2}\) for \(x= -1, y= -1\)
23. \(-2 (x - y)^2\) for \(x= -2, y= -3\)
24. \(x^2 + 2xy + y^2\) for \(x= -2, y= -3\)
25. \((x y)^3 - (x - y)^2\) for \(x= -2, y= -3\)

Simplify the following;

26. \(4ac - 2c - 5a + 7c + 6a - c\)
27. \(3a^2 - a^2c - 2a^2c - 5a^2\)
28. \(4x^2y - 5xy^2 - 6xy + 3xy^2 + x^2y + 2xy\)
29. \(2(4a - 2c) - (3a - 2c) + (7a - c)\)
30. \(5x^2(x - 2) - x(4x + 2) - 9x^2(-3x)\)
31. \(4y - [4y - 2(2y - 1) - 6]\)
32. \(4b - 7[3b - 2(b + 3) - 10] - 3\)

Solve the following equations:

33. \(17-3y = 9-y\)
34. \(10 (a -1) -2 (a+2) + 3 = 13\)
35. \(3[x - 4(x - 2)] - 6 = 4x - 7x\)
36. \(x^2 - 12 = x\)

37. \(\frac{5}{x^2-x} - \frac{1}{2x-2} = \frac{1}{x}\)
38. \(\frac{11}{x^2-9} - \frac{7}{2x+6} = \frac{2}{x+3}\)
39. Solve for y: \( x(y + w) - 3 = 5 \)

40. Solve for y: \( 2xy - \frac{y}{3} = 3x + 2 \)

41. Solve for t: \( x = \frac{2t - 3}{3t - 2} \)

Graph the solution set on the number line:

42. \( 7x - 2 < 8x + 1 \)

43. \( 5 - (2x + 3) \geq 6 \)

44. \( 3(x - 1) + 2(x + 5) \leq 2x + 4 \)

45. \( -5 < 2x - 1 < 3 \)

Simplify the following:

46. \( \frac{-10x^6}{4x^{10}} \)

47. \( \frac{-26a^6b^3c}{18ab^3c^3} \)

48. \( \frac{(-2x^6y^6)(6xy^5)}{-6x^4y^2} \)

49. \( \frac{8x - 16}{x^2 - 4} \)

50. \( \frac{y^2 - 8y + 16}{y^2 - 10y + 24} \)

51. \( \frac{4x^2 + 12x - 16}{2x^2 + 8x} \)

52. \( x^{-5} \)

53. \( \frac{(2xy^{-2})^2}{2x^2y^2z^3} \)

54. \( \frac{8a^3b^3}{32a^3b^4} \)

55. \( \frac{(-3x)^2}{5y} \)

56. \( \frac{2x^6y}{2^3x^2y^4} \)

57. \( \frac{(-2xy^3)^3}{2(x^5y)^4} \)

58. \( \frac{(-3a^2b^2)^3}{-9a^4b^3} \)

59. \( \frac{(4y^4)(5y^5)}{(8y^3)(y^6)} \)

60. \( \frac{(2x^2y^{-3})^0}{(x^3y)^2} \)
61. \(\left(\frac{3r^4s}{r^8s^3}\right)^2\)

Solve the following equations for the indicated variable:

62. \(\frac{x}{4} - 6 = \frac{x}{2}\)
63. \(0.02x + 0.5x = 10.4\)
64. \(\frac{2}{5}x - 4x = 2\)
65. \(x - [2x - 3] + 3x = 4[2x + 1]\)
66. \(\frac{4}{9}x - 2 + \frac{5}{6}x = 2x - \frac{1}{3}\)

67. \(2 - x = \frac{3 - y}{4}\) (for y)
68. \(\frac{x}{4} - \frac{x}{3} = 6\)
69. \(V = \frac{1}{3}BH\) (for B)
70. \(5(x - 2) = \frac{2}{3}y - 4x\) (for y)

Indicate the slope of the following line:

71. Passing through (2,4) and (-3, 5)
72. Passing through (2, -4) and (7, -4)
73. With equation: \(y = \frac{2}{3}x + 5\)
74. Passing through (3,0) (3,1)
75. With equation \(x = -5\)
76. With equation \(2x + y = 7\)

77. Passing through (-2, -5) and (-6, -3)
78. With equation \(x = 4\)
79. With equation \(4x + 6y = 2\)

Find the \(x\) and \(y\) intercepts for the following lines:

80. \(y = 3x + 5\)
81. \(4x = 8\)
82. \(3x + 4y = 2\)
83. \(3x + 2y = 12\)
84. \(2x = 5y\)

Find the slope with the given information

85. Find the slope for the line passing through (-2, 1) and (-3, -4)
86. Find the slope for the line with the equation \(4x = 2y - 1\)

Write the equation of the line with the given information

87. Line passing through (-2, 1) and (2, -3)
88. Line passing through (-2, -4) and has the slope of \(-\frac{1}{2}\)

Graph the following lines:

89. \(y = 3x - 5\)
90. \(2x + 3y = 2\)
91. Passing through (2,3) with the slope of -3
92. $4x = 6y$

93. Passing through (-2,3) with the slope of $\frac{2}{3}$

94. $3x = -9$

95. $y = -\frac{1}{2}x + 4$

96. Passing through (1,3) with the slope of 0

97. Passing through (2,4) with the slope of $\frac{2}{3}$

**Perform the indicated operations and simplify**

98. Add $5x^2 - 3x + 4$ and $2x^2 + 5$

99. $(3x^2y - 4xy - 2y) - (5x^2y + 2x - 3y)$

100. $5x(2x - 4 + 5y)$

101. $(3xy)(-2x) + 3x^2$

102. $2x(3x - 2) - 3(4x^2 - 4x + 1)$

103. Subtract $4x^2 + 4x + 2$ from $3x^2 - 4x + 1$

104. $(-3x)(3x - 2) - 2x(3 - 4x)$

105. $(5 - 3x)(2x + 1)$

106. $(x - 5)(3x^2 - 2x + 3) - 3(-2x)^3$

107. $(2x + 3)^2$

108. $4xy^2(2x^2 - 2) + 2y(x^3 + 5xy) - (3xy^2)(2x^2)$

**Factor as completely as possible**

109. $2x^2 - 11x + 5$

110. $x^4 + 5x^3 - 3x^2$

111. $4x^2 - 8xy + x - 2y$

112. $5y^3 - 15y^2 + 10y$

113. $9x^2 - 81$

114. $6x^3y - 3x^2y + 9x^2y^2$
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115. \[6a^2 - 18a + 12\]
116. \[2x^2 - 7x + 3\]
117. \[x^2 + x - 6\]

129. \[6 - 4(x - 2) = 4x - 8\]
130. \[4x - 6(x - 2) \geq 10 (x-6)\]
131. \[5(a - 1) - 8a \geq 3 - a\]

Preform the indicated operation:

132. \[\frac{4x}{x^2-4} \cdot \frac{x^2-5x+6}{4x^2-12x}\]
133. \[\frac{x^2+6x+9}{x^2+9} \div \frac{2x+6}{4x^2+36}\]
134. \[\frac{1}{10x^2} - \frac{7}{6xy}\]
135. \[\frac{5}{6x} + \frac{3}{8x^2}\]
136. \[\frac{3y}{5x} - \frac{2}{x^2} - \frac{y}{2x}\]
137. \[\frac{3}{x^2-6x} - \frac{2}{x^2+6x}\]

Solve the following systems of equations:

118. \[5x - y = 18\]
\[x + 2y = -3\]
119. \[y = 3x - 2\]
\[y = -x - 6\]
120. \[4x + 3y = 0\]
\[x = y - 4\]

Simplify:

121. \[\sqrt{36m^6n^{18}}\]
122. \[\sqrt{54x^{17}y^{14}z^5}\]
123. \[\sqrt{\frac{12}{18}}\]
124. \[\frac{12}{5\sqrt{6}}\]

Solve:

125. \[x^2 + 5 = 21 - 3x^2\]
126. \[x^2 - 2x - 5 = 0\]
127. \[x^2 + 10 = 7x\]
128. \[4x - 2(x - 3) = 12\]
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Word Problems:

**Comparison – Direct Translation**

1. The sum of forty-three and a number is eighty-nine. Find the number.
2. Sixteen more than twice a number is eighty. Find the number.
3. Forty-nine is three less than twice a number. Find the number.
4. Fifty-one more than nine times a number is one hundred fourteen. What is the number?
5. Eight less than five times a number is forty-eight less than the number. Find the number.
6. Three added to five times a number is forty-three more than the number. Find the number.
7. Fifteen less than a number is the same as three more than the quotient of the number and three. Find the number.
8. Karen is twelve years older than Michael. If the sum of their ages is fifty-eight, what are their ages?
9. If one half of a number is added to three quarters of that number, the sum is 45. What is the number?
10. Sydney is three years younger than Brian. The sum of their ages is seven. How old is Sydney?
11. Two-fifths of a number is seven less than three fourths of the number. What is the number?
12. A number is three less than four times another number. Their sum is one hundred two. What are the numbers?
13. Two less than three quarters of a number is seven less than one eighth of the number. What is the number?
14. I have $15,000 invested in bonds and stocks. The amount I invested in bonds is $2,000 more than what I invested in stocks. How much did I invest in bonds?
15. Chris has two different job offers selling toasters. Toast Master offers $1,000 per month plus a commission of $10 for each toaster sold. Perfect Toast offers $400 a month plus
$20 commission for every toaster sold. How many toasters does Chris have to sell for both jobs to pay the same salary?

16. Sara bought a sweater, a pair of jeans and a pair of shoes. The shoes cost $8 more than the jeans and the sweater cost $5 less than the jeans. If she spent $162, how much did the sweater cost?

17. I am comparing two cell phone plans. “Talk-Away’ charges $12 per month plus $0.10 per minute. “Chatty-Chat” charges $0.15 a minute with no monthly charge. For how many minutes will the cost of both plans be the same?

18. A table, chair, and rug cost $1,200 excluding tax. The price of the chair is half the price of the table. The price of the rug is three times the price of the chair. Find the price of each one of the items.

19. Health Insurance Plan A charges $200 a month plus a $25 co-pay for each doctor’s visit. Plan B charges $125 a month and $30 co-pay for each doctor’s visit. For how many doctor’s visit will both plans be the same? How do I know which plan I should choose?

20. I bought a table, a chair, and a lamp for $490 not including tax. The chair is $100 less than the table. The lamp is half the price of the chair. What is the price of each item?

21. Club 4-ME has two membership plans. Plan A charges $250 a month and $10 per visit while Plan B charges $20 per visit but no monthly fee. How can I decide which plan is best?

22. The sum of two numbers is 19. Their difference is 5. Find the numbers.

23. Find the two numbers whose sum is 146 and their difference is 68.

24. One number is 8 more than three times another. If the sum of the numbers is 16, find the numbers.

25. One number is 4 less than 3 times another number. If the sum of the numbers is 36, what are the numbers?

26. The sum of two numbers is 5, and the difference between the first number and twice the second number is 29. Find the numbers.
27. Two angles are supplementary (their sum is 180˚) One angle measure 20˚ more than four times the measure of the other. Find the measure of each angle.

28. Brittany and John packed an order of 840 awards. Brittany packed 200 more than John. How many awards did each pack?

29. The difference between two numbers is 16. Five times the larger number is nine times the smaller. What are the numbers?

30. Two angles are supplementary (their sum is 180˚). One angle is 15˚ less than twice the other. Find the measure of the angles.

Consecutive Integers

31. The sum of three consecutive integers is 126. Find the integers.

32. The sum of four consecutive integers is 210. Find the integers.

33. The sum of two consecutive odd integers is 72. Find the integers.

34. The sum of three consecutive even integers is 66. Find the integers.

35. The perimeter of a triangle is 162 inches. If the sides of the triangle are consecutive integers, what are the dimensions of the triangle?

36. The sum of three consecutive integers is 66. Find the integers.

37. The sum of four consecutive odd integers is 96. Find the integers.

38. Find three consecutive even integers so that the largest is two times the smallest.

39. Three consecutive integers are such that the sum of the second and the third is one less than three times the first. Find the three integers.

40. The sum of three consecutive integers is 11 less than 5 times the first integer. Find the numbers.

41. The sum of three consecutive even integers is twenty more than twice the smallest. What is the middle integer?

42. Four consecutive odd integers such that the second one is twenty-five less than twice the largest one. What is the largest integer?
Perimeter – Rectangles and Triangles

43. The perimeter of a triangle is 162 inches. If the measurements of the sides of the triangle are consecutive integers, what are the dimensions of the triangle?

44. The length of a rectangular is 6” longer than its width. If the perimeter is 112”, what are the dimensions of the rectangle?

45. The length of a rectangular parking area is four times its width. The perimeter is 300 yards. Find the dimensions of the parking area.

46. The perimeter of a rectangle is 48”. The length is 3” less than twice its width. What are the dimensions of this rectangle?

47. The width of a rectangle is 5 less than one third its length. If the perimeter is 206”, what are the dimensions of the rectangle?

48. The longest side of a triangle is four inches longer than the shortest side. The remaining side is two inches longer than the shortest side. The perimeter of the triangle is 24”. What is the length of the longest side?

49. The perimeter of a rectangular table is 180”. The table is 18” longer than it is wide. What are the dimensions of the rectangle?

50. The length of a rectangle is five less than four times its width. If the perimeter is 80 meters, find the dimensions of the rectangle.

51. The perimeter of a rectangular vegetable garden is 76’. If the garden’s length is to be 6 ft more than 5 times its width, how many feet is the width?

52. The shorter side of a triangle is 5” less than the medium size side. The larger side is 12” more than the medium size side. If the perimeter is 40”, find the size of each side of the triangle.

53. The perimeter of a rectangle is 98”. The width is 3” less than one third its length. Find the dimensions of this triangle.

54. The perimeter of a triangle is 20. The small side is one third of the large side and the medium side is 5” more than the small side. What are the dimensions of this triangle?

55. John has 312 ft. of fencing for a rectangular garden. If the garden’s length is to be 6 ft more than 5 times its width, what should the garden’s dimensions be?
56. A rectangle has a perimeter of 124 ft. The width is 10 ft. less than the length. Find the length and width.

57. If the width of a rectangle is 9 ft. less than twice its length, and the perimeter is 30 ft., Find the length and width.

58. The length of a rectangle is 18 inches more than two third of its width. If the perimeter of this rectangle is 96 inches, find its dimensions.

59. The perimeter of a rectangle is 102’. The width is 3’ more than one fifth its length. What is the width of this rectangle?

60. The perimeter of a maximum rugby field is 428m. The length is 4m longer than twice the width. Find its dimensions.

61. The perimeter of a rectangle is 134’. The width is 3’ less than one sixth its length. What are the dimensions of the rectangle?

**Value/ Cost:**

62. The Clarkston Volunteer Fire Department served 137 chicken and noodle dinners. A child’s plate cost $5 and an adult’s plate cost $7. A total of $ 719 was collected. How many of each type of plate was served?

63. Admission to Mammoth Cave is $12 for adults and $8 for children. One day, 575 people entered the cave paying a total of $5600. How many adults and how many children entered the cave?

64. Creative Candles sells small candles for $3 each and the large ones for $5 each. Yesterday they collected $103. If they sold three more large candles than the small ones, how many of each size candles were sold?

65. Charlie bought five shirts and four pairs of socks for $87. He returned to the same store a week later and purchased at the same prices two shirts and six pairs of socks for $48. How much does each shirt and each pair of socks cost?

66. Four hamburgers and three orders of fries cost $38.00. Two hamburgers and two orders of fries cost $21. How much would one hamburger cost?
67. A television network plays 40 commercials during a sports game. Each commercial is either 30 seconds or 45 seconds long. If the total commercial time during the game is 24 minutes, how many commercials of each type does the network play?

Coins:

68. A collection of 20 coins consisting of dimes and quarters has a total value of $3.95. How many of each type of coins are there?

69. Liz received change of $1.15 in nickels and dimes. If the cashier gave her 20 coins, how many nickels did Liz get?

70. Susan has $1.45 in nickels and dimes. The number of dimes is 4 more than the number of nickels. How many nickels and dimes does she have?

71. I have $5.55 in nickels, dimes, and quarters. The number of dimes I have is 5 more than the number of nickels I have. If I have a total of 35 coins, how many coins of each type do I have?

72. Wanda gave $5.30 in nickels, dimes and quarters to her little sister. The number of dimes was three more than the number of nickels, and the number of quarters was 20 less than the number of nickels. Find the number of each kind of coin she gave to her sister.

Mixture:

73. The owner of a candy store wishes to sell a mix candy selling for $1.50 per pound with nuts selling for $1.00 per pound to obtain a party mix to be sold for $1.20 per pound. How many pounds of each must be used to obtain a 50 pound of the mixture?

74. Wholesome Foods sells dried apricots for $12 per pound and dried apples for $7 per pound. How many pounds of each fruit should be used to make a 40 lb mixture that sells for $9 per pound?

75. How many pounds of chocolate selling for $1.20 a pound must be mixed with 10 pounds of chocolate selling for 90 cents a pound to produce a mixture that sells for $1.00 a pound?
Investment:

76. Whitney’s two student loans totaled $1400. One of her loans was at 5% simple interest rate and the other one at 7%. After one year Whitney owed $850 in interest. What was the amount of each loan?

77. Carol invests $2500 for one year. She invests part in a bond paying 5 percent and the rest in a fund paying 3 percent interest. If the total received is $95.00 how much did Carol invest in the bond?

78. You invested some money in You-Risk-It Fund yielding 14% annual interest rate and in the Extra–Dull Fund which yields 6% interest. In the Extra-Dull Fund you invested $2000 less than in the You-Risk-It Fund. If at the end of the year you earned $1880 in interest, how much did you invest in each fund?

79. An investor deposited an amount of money into a high–yield mutual fund that returns 9% annual simple rate. A second deposit $2500 more than the first was placed in a certificate deposit that returns a 5% annual simple interest rate. The total interest earned on both investments for one year was $475. How much money was deposited in the mutual fund?

Motion

80. Jim and Sarah are camping. They decide to leave their tent and walk in opposite directions around a lake. Jim hikes at the rate of 3 miles per hour. Sarah hikes at the rate of 2 miles per hour. The perimeter of the lake is 10 miles. How long will it be before they meet?

81. Two cars leave a city at the same time. One travels east and the other travels west. The car going east travels at 60 mph while the one traveling west travels at 62 mph. How long will it take them to be 549 miles apart?
82. John and Mike leave the parking lot on their bicycles at the same time biking in opposite directions. John is biking 3mph faster than Mike. After 4 hours they are 84 miles apart. How fast are John and Mike hiking?
83. Two trains leave cities 300 miles apart. They both leave at 11:00 am and are traveling towards each other on parallel tracks. One train travels at 60mph and the other at 90mph. At what time do they pass each other?
84. If I were to drive from my home to my friend’s house at a constant speed it would take me 5 hours. If I were to drive 15mph slower, it would take me 6.5 hours. How many miles is it to my friend’s house?
85. Kate left for Atlanta driving at 40 mph. Her husband Matt is also going to Atlanta but he left an hour later traveling at 50 mph. How long will it take Matt to catch up with Kate?
86. Michael can drive from his house to Cleveland in 6 hours. If he were to increase his speed by 20 mph, he would make the trip in 4 hours. How many miles is Michael’s house from Cleveland?
87. A freight train leaves a station traveling at 30mph. A passenger train leaves one hour later traveling at 50 mph. How long will it take the passenger train to pass the freight train?
88. When Chris drives to his friend Bob’s house it takes him three hours. If he were to drive 5 mph slower it would take him four hours. How many miles is it from Chris’s to Bob’s house?
89. Two trains leave Penn Station in Newark. One train is going to Boston and the other one to Washington DC. The Boston bound train leaves at 8:00 am and travels 60 mph. The train going to DC leaves at 9:00 am and travels at 80 mph. At what time will they be 200 miles apart?
90. The perimeter of Wet Water Lake is 20 miles. Fred and his friend Matt decide to hike around the lake going in opposite directions; they meet up after 2.5 hours. If Fred walked 2mph slower than Matt. How fast was Fred walking?
91. It takes Ron 8 hours to drive from his home back to college, a distance of 410 miles. Before lunch his average speed is 45mph and after lunch it is 55mph. How many hours did he travel at each speed?

92. On Monday I ride my bike for 3 hours and walk for 1 hour, travelling 34 miles. On Tuesday, I ride my bike for 2 hours and walk for 2 hours, travelling 28 miles. What are my rates (speeds) walking and riding my bike?

93. John and Rob live 550 miles away from each other. They are going to meet up somewhere on the highway and decide to drive toward each other at 4PM. John travels at 60 mph and Rob at 50 mph. At what time will they meet?

94. A passenger plane made a trip to Las Vegas and back. On the trip there it flew at 432 mph and on the return trip at 480 mph. How long did the trip there take if the return trip took 9 hours?

95. Michelle and Chris leave by car from the same location travelling in opposite directions. Michelle leaves at 2pm driving at 55mph, while Chris leaves at 3pm driving at 45mph. At what time will they be 280 miles apart?

96. At 9am James left New Orleans for Tallahassee averaging 47mph. Two hours later, Danielle left Tallahassee from New Orleans along the same route, driving 5mph faster than James. If the two cities are 391 miles apart, at what time did James and Danielle meet?

**Motion- Rational Equations:**

97. Bob’s boat travels 14 mph in still water. Find the speed of the current if he can go 3 miles upstream at the same time that it takes to go 4 miles downstream.

98. Allen can travel 12 miles downstream in his motorboat in the same time he travels 8 miles upstream. If the current of the river is 3mph, what is the boat’s rate in still water?

99. While training for an iron man competition, Tony bikes for 42 miles and runs for 29 miles. If his biking speed is 6 times his running speed and it takes him 6 hours to complete the training, how fast does he bike?
Ratio and Proportions

100. The ratio of the width to the length of a rectangle is 8 to 9. If the length is 72 feet, find the width of the rectangle.

101. The scale on a map indicates that 6 inches is equivalent to 180 miles. If the distance between Milford, CT and Paramus, NJ is 2.5 inches on this map, how many miles apart are the two cities?

102. In a recent election, one candidate won in a ratio of 7 to 4. If the total number of votes was 550, how many votes did the loser receive?

103. The ratio of two positive integers is 4 to 9 and the sum of the two integers is 52, what are the numbers?

104. One number is six more than another. If their ratio is 7 to 9, what are the numbers?

105. The ratio of two positive numbers is 5 to 6. If one number is eight less than the other, what are the two numbers?

106. The length of a rectangle is 3 inches more than its width. The ratio of the length of the rectangle to the perimeter is 1 to 3. Find the dimensions of the rectangle.