

M117 Review for Final Exam

Revised FALL 2005

PLEASE BE ADVISED THAT THIS REVIEW IS ONLY A SAMPLING OF QUESTIONS FROM THE COURSE. ALL NOTES, HOMEWORK, EXAMS, QUIZZES, ETC. SHOULD ALSO BE REVIEWED.

- 1) (Chap 7) Factor Completely. $4a^2b^2 + 12ab^3$
- 2) (Chap 7) Factor Completely. $2a^2 - 3bc - 2ab + 3ac$
- 3) (Chap 7) Factor Completely. $9x^2 - 25$
- 4) (Chap 7) Factor Completely. $4x^2 + 9$
- 5) (Chap 7) Factor Completely. $3x^2 - 11x + 10$
- 6) (Chap 7) Factor Completely. $8y^2 + 22y - 21$
- 7) (Chap 7) Factor Completely. $x^3 + 64$
- 8) (Chap 7) Factor Completely. $27x^3 - 8y^3$
- 9) (Chap 7) Factor Completely. $1 - 16x^4$
- 10) (Chap 7) Factor Completely. $18x^3 + 39x^2 - 15x$
- 11) (Chap 7) Solve $x^2 - 10x + 16 = 0$
- 12) (Chap 7) Solve $x(x - 24) = -128$
- 13) (Chap 7) Solve $(x - 5)(x + 3) = 9$
- 14) (Chap 7) Solve $2x^3 = 50x$
- 15) (Chap 7) One leg of a right triangle is 7 meters longer than the other leg. If the length of the hypotenuse is 17 meters, find the length of each leg. (NO EQUATION = NO CREDIT)
- 16) (Chap 7) The width of a rectangle is 6 kilometers less than twice its length. If its area is 216 square kilometers, find the dimensions of the rectangle. (NO EQUATION = NO CREDIT)
- 17) (Chap 7) One leg of a right triangle is 2 inches longer than the other leg. The hypotenuse is 4 inches longer than the shorter leg. Find the lengths of the three sides of the right triangle. (NO EQUATION = NO CREDIT)
- 18) (Chap 7) The product of two consecutive odd whole numbers is one less than five times their sum. Find the numbers. (NO EQUATION = NO CREDIT)
- 19) (9.1) Simplify $\frac{-30x^2y^2z^2}{-35xz^3}$

20) (9.1) Simplify $\frac{x^2 - 4}{x^2 + 2x}$

21) (9.1) Simplify $\frac{4x^2 - 15x - 4}{7x^2 - 30x + 8}$

22) (9.1) Simplify $\frac{3x - x^2}{x^2 - 9}$

23) (9.2) Perform the operation and leave in simplest form. $\frac{4x^2}{5y^2} \cdot \frac{15xy}{24x^2y^2}$

24) (9.2) Perform the operation and leave in simplest form. $\frac{x^4 - 81}{x^2 - 6x + 9} \div \frac{5x^2 + 8x - 21}{6x^2 - 11x - 21}$

25) (9.3) Perform the operation and leave in simplest form. $\frac{6x}{x - 3} - \frac{18}{x - 3}$

26) (9.3) Perform the operation and leave in simplest form. $\frac{x + 1}{4} + \frac{x - 3}{6} - \frac{x - 2}{8}$

27) (9.3) Perform the operation and leave in simplest form. $\frac{7}{3x^2} - \frac{9}{4x} - \frac{5}{2x}$

28) (9.3) Perform the operation and leave answer in simplest form. $2 + \frac{4x}{3x - 1}$

29) (9.4) Perform the operation and leave answer in simplest form. $\frac{3x}{x^2 - 36} - \frac{2}{5x + 30}$

30) (9.4) Perform the operation and leave in simplest form. $\frac{2x}{6x^2 + 11x - 10} + \frac{x}{2x^2 - 3x - 20}$

31) (9.4) Perform the operation and leave in simplest form. $\frac{32x + 9}{12x^2 + x - 6} - \frac{3}{4x + 3} - \frac{x + 5}{3x - 2}$

32) (9.4) Simplify the complex fraction. $\frac{\frac{4}{ab} - \frac{3}{b^2}}{\frac{1}{a} + \frac{3}{b}}$

33) (9.5) Solve $\frac{5}{7x} - \frac{5}{6} = \frac{1}{6x}$

34) (9.5) Solve $\frac{5}{2x - 1} = \frac{-6}{3x + 2}$

- 35) (9.5) Solve $\frac{2x}{x-2} + \frac{15}{x^2-7x+10} = \frac{3}{x-5}$
- 36) (9.6) Solve $\frac{2}{n-2} - \frac{n}{n+5} = \frac{10n+15}{n^2+3n-10}$
- 37) (9.6) Solve $\frac{x}{x+2} + \frac{3}{x+4} = \frac{14}{x^2+6x+8}$
- 38) (9.6) Solve $I = \frac{100M}{C}$ for M.
- 39) (9.6) Solve $\frac{x}{a} + \frac{y}{b} = 1$ for y.
- 40) (9.6) Alice can vacuum in 15 minutes. It takes Bob 35 minutes to do the same job. Find the time it takes Alice and Bob to do the job together. (NO EQUATION = NO CREDIT)
- 41) (9.6) Suppose that Wendy rides her bicycle 30 miles in the same time that it takes Kim to ride her bicycle 20 miles. If Wendy rides 5 miles per hour faster than Kim, find the rate of each. (NO EQUATION = NO CREDIT)
- 42) (9.6) To travel 60 miles, it takes Sue, riding a moped, 2 hours less time than it takes Doreen to travel 50 miles riding a bicycle. Sue travels 10 miles per hour faster than Doreen. Find the times and rates of both girls. (NO EQUATION = NO CREDIT)
- 43) (10.1) Simplify 2^{-4}
- 44) (10.1) Simplify $\frac{1}{2^{-6}}$
- 45) (10.1) Simplify $\left(\frac{2}{7}\right)^{-2}$
- 46) (10.1) Simplify $\left(-\frac{3}{4}\right)^0$
- 47) (10.1) Simplify $3^{-4} \cdot 3^6$
- 48) (10.1) Simplify $(2^{-4})^{-2}$
- 49) (10.1) Simplify $\left(\frac{3^2}{5-1}\right)^{-1}$
- 50) (10.1) Simplify $2^{-4} + 5^{-1}$
- 51) (10.1) Simplify $(a^3b^{-3}c^{-2})^{-5}$

- 52) (10.1) Simplify $\left(\frac{2xy^2}{5a^{-1}b^{-2}}\right)^{-1}$
- 53) (10.1) Simplify $\left(\frac{8xy^3}{-4x^4y}\right)^{-3}$
- 54) (10.1) Simplify $2x^{-1} - 3y^{-2}$
- 55) (10.2) Simplify $\sqrt[3]{-\frac{8}{27}}$
- 56) (10.2) Simplify $\sqrt{160}$
- 57) (10.2) Simplify $-4\sqrt{54}$
- 58) (10.2) Simplify $\frac{6\sqrt{5}}{5\sqrt{12}}$
- 59) (10.2) Simplify $\frac{3}{\sqrt[3]{3}}$
- 60) (10.3) Simplify $13\sqrt{28} - 2\sqrt{63} - 7\sqrt{7}$
- 61) (10.3) Simplify $\frac{3}{8}\sqrt{96} - \frac{2}{3}\sqrt{54}$
- 62) (10.3) Simplify $-3\sqrt[3]{2} - 2\sqrt[3]{16} + \sqrt[3]{54}$
- 63) (10.3) Simplify $\sqrt{96a^7b^8}$
- 64) (10.3) Simplify $\frac{\sqrt{5y}}{\sqrt{18x^3}}$
- 65) (10.3) Simplify $\frac{\sqrt[3]{2y}}{\sqrt[3]{3x}}$
- 66) (10.3) Simplify $-3\sqrt{2x^3} + 4\sqrt{8x^3} - 3\sqrt{32x^3}$
- 67) (10.4) Simplify $(-3\sqrt{3})(-4\sqrt{8})$
- 68) (10.4) Simplify $\left(4\sqrt[3]{3}\right)\left(5\sqrt[3]{9}\right)$
- 69) (10.4) Simplify $\sqrt{2x}(\sqrt{12xy} - \sqrt{8y})$
- 70) (10.4) Simplify $(7\sqrt{3} - \sqrt{7})(2\sqrt{3} + 4\sqrt{7})$

71) (10.4) Simplify $(2\sqrt{3} + \sqrt{11})(2\sqrt{3} - \sqrt{11})$

72) (10.4) Simplify $2\sqrt[3]{2}(3\sqrt[3]{6} - 4\sqrt[3]{5})$

73) (10.4) Simplify $\frac{\sqrt{7}}{3\sqrt{2} - 5}$

74) (10.5) Solve $2\sqrt{n} - 7 = 0$

75) (10.5) Solve $\sqrt{x^2 + 3} - 2 = 0$

76) (10.5) Solve $\sqrt{n^2 - 2n - 4} = n$

77) (10.5) Solve $\sqrt[3]{2x + 5} = \sqrt[3]{4 - x}$

78) (10.5) Solve $\sqrt{x + 4} = \sqrt{x - 1} + 1$

79) (10.6) Simplify $16^{\frac{3}{2}}$

80) (10.6) Simplify $\left(\frac{1}{8}\right)^{-\frac{2}{3}}$

81) (10.6) Simplify $(-32)^{\frac{1}{5}}$

82) (10.6) Express in radical form $5x^{\frac{1}{4}}$

83) (10.6) Simplify $\left(\frac{3}{y^4}\right)\left(y^{-\frac{2}{3}}\right)$

84) (10.6) Simplify $(9x^2y^4)^{\frac{1}{2}}$

85) (10.6) Simplify $(a^2b^{-3})^{-\frac{1}{3}}$

86) (11.2) Solve $6x^2 - 5x - 21 = 0$

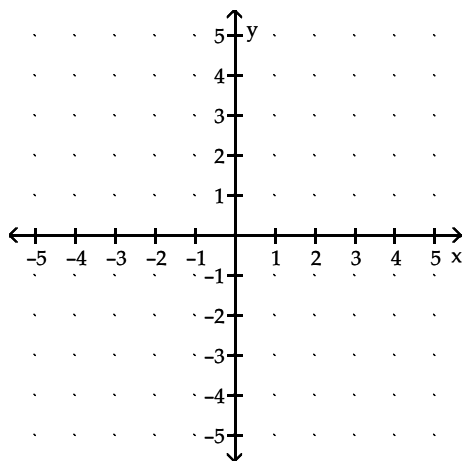
87) (11.2) Solve $\sqrt{3x} + 6 = x$

88) (11.2) Solve $3t^2 = 8$

89) (11.2) Solve $(t + 5)^2 = 12$

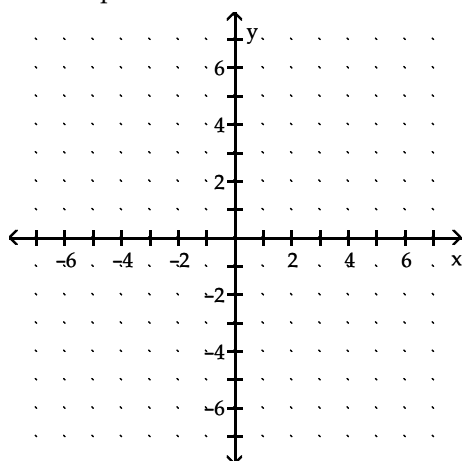
- 90) (11.2) A 24-foot ladder resting against a house reaches a windowsill 16 feet above the ground. How far is the foot of the ladder from the house? (to the nearest tenth of a foot)
(NO EQUATION = NO CREDIT)
- 91) (11.4) Use the discriminant to determine the number and nature of the roots, then solve using the quadratic formula. $9x^2 - 6x + 1 = 0$
- 92) (11.4) Use the discriminant to determine the number and nature of the roots, then solve using the quadratic formula. $4x^2 - 2x = 3$
- 93) (11.5) Solve $\frac{5}{n-3} - \frac{3}{n+3} = 1$
- 94) (11.5) Solve $5x^4 - 32x^2 + 48 = 0$
- 95) (11.5) Find two consecutive odd whole numbers such that the sum of their squares is 74.
(NO EQUATION = NO CREDIT)
- 96) (11.5) The perimeter of a rectangle is 44 inches and its area is 112 square inches. Find the length and width of the rectangle. (NO EQUATION = NO CREDIT)
- 97) (11.5) A rectangular sign must have an area of 42 square feet. The length of the sign is 2 feet more than the width. Find the dimensions of the sign. (NO EQUATION = NO CREDIT)
- 98) (12.1) Given $(-2, -4)$ and $(4, 0)$
a. Find the distance between the two points.
b. Determine the slope of the line that passes through the two points.
- 99) (12.2) Write the equation of the line with $m = -\frac{3}{5}$ passing through the point $(-2, -4)$.
- 100) (12.2) Write the equation of the line that passes through the points $(-2, 5)$ and $(3, -3)$.
- 101) (12.2) Write the equation of the line that has an x-intercept of -1 and a y-intercept of -3 .
- 102) (12.2) Write the equation of the line that contains the point $(5, 6)$ and is perpendicular to the y-axis.
- 103) (12.2) Write the equation of the line that contains the point $(1, 3)$ and is parallel to the line $x + 5y = 9$.
- 104) (12.2) In a certain city, the cost of a taxi ride is computed as follows: There is a fixed charge of \$2.95 as soon as you get in the taxi, to which a charge of \$1.65 per mile is added. Find a linear equation that can be used to determine the cost, $C(x)$, of an x -mile taxi ride, and use this equation to find the cost of a 5-mile taxi ride.
- 105) (12.2) The cost of manufacturing a molded part is related to the quantity produced during a production run. When 100 parts are produced, the cost is \$300. When 600 parts are produced, the cost is \$2800. Find a linear equation that models cost, $C(x)$, in terms of the number of parts produced, x .

106) (12.2) Graph the following linear equation: $y = -\frac{1}{2}x + 3$



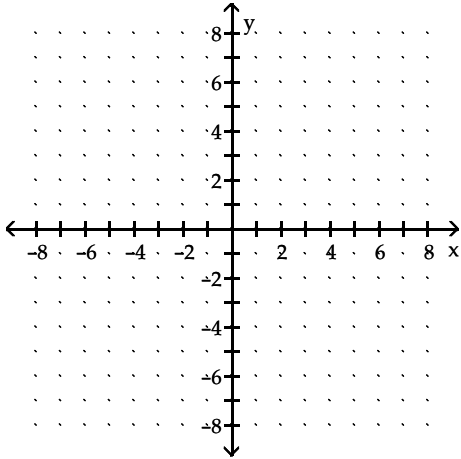
107) (12.3) Given the following quadratic equation: $y = -(x + 4)^2 + 1$

- What is the vertex?
- Which way does the parabola open?
- What is the y-intercept?
- Graph.



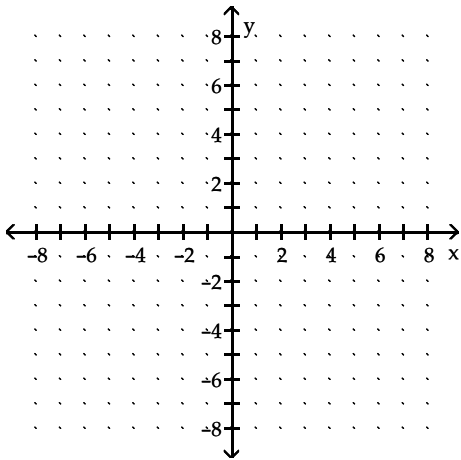
108) (12.4) Given the following quadratic equation: $y = 4x^2 - 24x + 32$

- What is the vertex?
- What are the x-intercepts (if any)?
- What is the y-intercept?
- Which way does the parabola open?
- Graph.



109) (12.4) Given the following quadratic equation: $y = -2x^2 - 4x - 5$

- What is the vertex?
- What are the x-intercepts (if any)?
- What is the y-intercept?
- Which way does the parabola open?
- Graph



Answer Key

Testname: M117 FINAL REVIEW FALL 05

- 1) $4ab^2(a + 3b)$
- 2) $(a - b)(2a + 3c)$
- 3) $(3x + 5)(3x - 5)$
- 4) Not factorable.
- 5) $(3x - 5)(x - 2)$
- 6) $(4y - 3)(2y + 7)$
- 7) $(x + 4)(x^2 - 4x + 16)$
- 8) $(3x - 2y)(9x^2 + 6xy + 4y^2)$
- 9) $(1 + 2x)(1 - 2x)(1 + 4x^2)$
- 10) $3x(2x + 5)(3x - 1)$
- 11) 2, 8
- 12) 8, 16
- 13) -4, 6
- 14) 0, -5, 5
- 15) 8 m and 15 m
- 16) length = 12 km, width = 18 km
- 17) 6, 8, 10 inches
- 18) 9 and 11
- 19) $\frac{6xy^2}{7z}$
- 20) $\frac{x - 2}{x}$
- 21) $\frac{4x + 1}{7x - 2}$
- 22) $\frac{-x}{x + 3}$
- 23) $\frac{x}{2y^3}$
- 24) $\frac{(x^2 + 9)(6x + 7)}{5x - 7}$
- 25) 6
- 26) $\frac{7x}{24}$
- 27) $\frac{28 - 57x}{12x^2}$
- 28) $\frac{10x - 2}{3x - 1}$
- 29) $\frac{13x + 12}{5(x + 6)(x - 6)}$
- 30) $\frac{5x^2 - 10x}{(2x + 5)(3x - 2)(x - 4)}$
- 31) $\frac{-4x^2}{(4x + 3)(3x - 2)}$
- 32) $\frac{4b - 3a}{b^2 + 3ab}$
- 33) $\frac{23}{35}$
- 34) $-\frac{4}{27}$
- 35) $3, \frac{7}{2}$
- 36) -1
- 37) -8, 1
- 38) $M = \frac{IC}{100}$
- 39) $y = \frac{ab - bx}{a}$
- 40) $10\frac{1}{2}$ minutes
- 41) 10 mph for Kim and 15 mph for Wendy
- 42) Doreen: 10 mph for 5 hours; Sue: 20 mph for 3 hours
- 43) $\frac{1}{16}$
- 44) 64
- 45) $\frac{49}{4}$
- 46) 1
- 47) 9
- 48) 256
- 49) $\frac{1}{45}$
- 50) $\frac{21}{80}$
- 51) $\frac{b^{15}c^{10}}{a^{15}}$
- 52) $\frac{5}{2ab^2xy^2}$
- 53) $-\frac{x^9}{8y^6}$
- 54) $\frac{2y^2 - 3x}{xy^2}$
- 55) $-\frac{2}{3}$
- 56) $4\sqrt{10}$
- 57) $-12\sqrt{6}$
- 58) $\frac{\sqrt{15}}{5}$
- 59) $\sqrt[3]{9}$
- 60) $13\sqrt{7}$

Answer Key

Testname: M117 FINAL REVIEW FALL 05

61) $\frac{-\sqrt{6}}{2}$

62) $-4\sqrt[3]{2}$

63) $4a^3b^4\sqrt{6a}$

64) $\frac{\sqrt{10xy}}{6x^2}$

65) $\frac{\sqrt[3]{18x^2y}}{3x}$

66) $-7x\sqrt{2x}$

67) $24\sqrt{6}$

68) 60

69) $2x\sqrt{6y} - 4\sqrt{xy}$

70) $14 + 26\sqrt{21}$

71) 1

72) $6\sqrt[3]{12} - 8\sqrt[3]{10}$

73) $\frac{3\sqrt{14} + 5\sqrt{7}}{-7}$

74) $\frac{49}{4}$

75) 1, -1

76) \emptyset

77) $-\frac{1}{3}$

78) 5

79) 64

80) 4

81) -2

82) $5\sqrt[4]{x}$

83) $y\sqrt[12]{\frac{1}{12}}$

84) $3xy^2$

85) $\frac{b}{\frac{2}{a^3}}$

86) $-\frac{3}{2}, \frac{7}{3}$

87) 12

88) $\pm \frac{2\sqrt{6}}{3}$

89) $-5 \pm 2\sqrt{3}$

90) 17.9 feet

91) discriminant is 0, so 1 real root

$\frac{1}{3}$

92) discriminant is 52, so 2 real roots

$\frac{1 \pm \sqrt{13}}{4}$

93) $1 \pm \sqrt{34}$

94) $\pm 2, \pm \frac{2\sqrt{15}}{5}$

95) 5 and 7

96) 8 inches by 14 inches

97) $(1 + \sqrt{43})$ yards by $(-1 + \sqrt{43})$ yards

98) a. $d = 2\sqrt{13}$

b. $m = \frac{2}{3}$

99) $y = -\frac{3}{5}x - \frac{26}{5}$

100) $y = -\frac{8}{5}x + \frac{9}{5}$

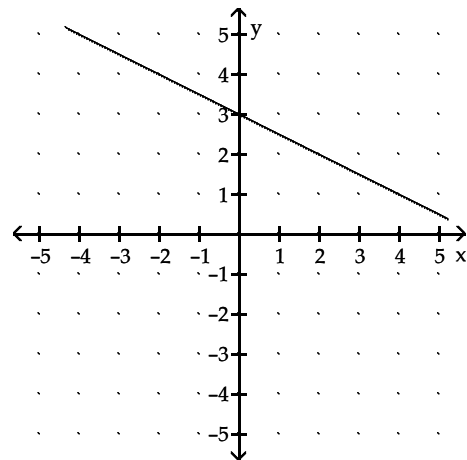
101) $y = -3x - 3$

102) $0x + y = 6$ OR $y = 6$

103) $y = -\frac{1}{5}x + \frac{16}{5}$ OR $x + 5y = 16$

104) $C(x) = 2.95 + 1.65x$
\$11.20

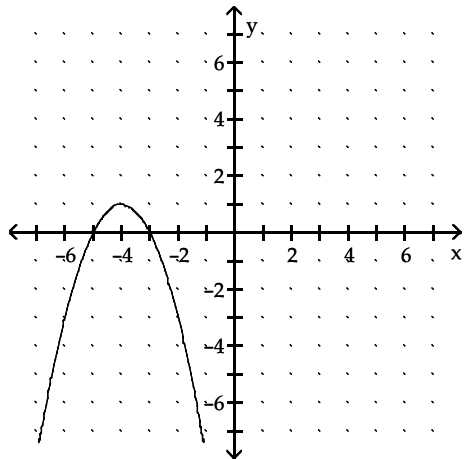
105) $C(x) = 5x - 200$



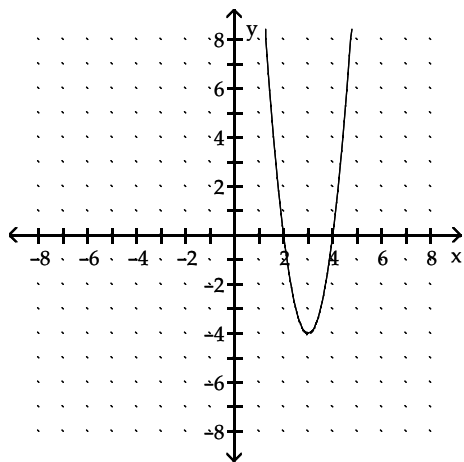
Answer Key

Testname: M117 FINAL REVIEW FALL 05

- 107) a. $(-4, 1)$
b. down
c. $(0, -15)$
d.



- 108) a. $(3, -4)$
b. $(4, 0)$ and $(2, 0)$
c. $(0, 32)$
d. up



- 109) a. $(-1, -3)$
b. No x-intercepts
c. $(0, -5)$
d. down

