



MATH PLACEMENT REVIEW GUIDE

This guide is intended to help you review for the Accuplacer Placement test. The questions presented in this guide will not be exactly the same as those that appear on the placement test, but they will provide you with a means of brushing up on some of the important skills that will be addressed on placement test.

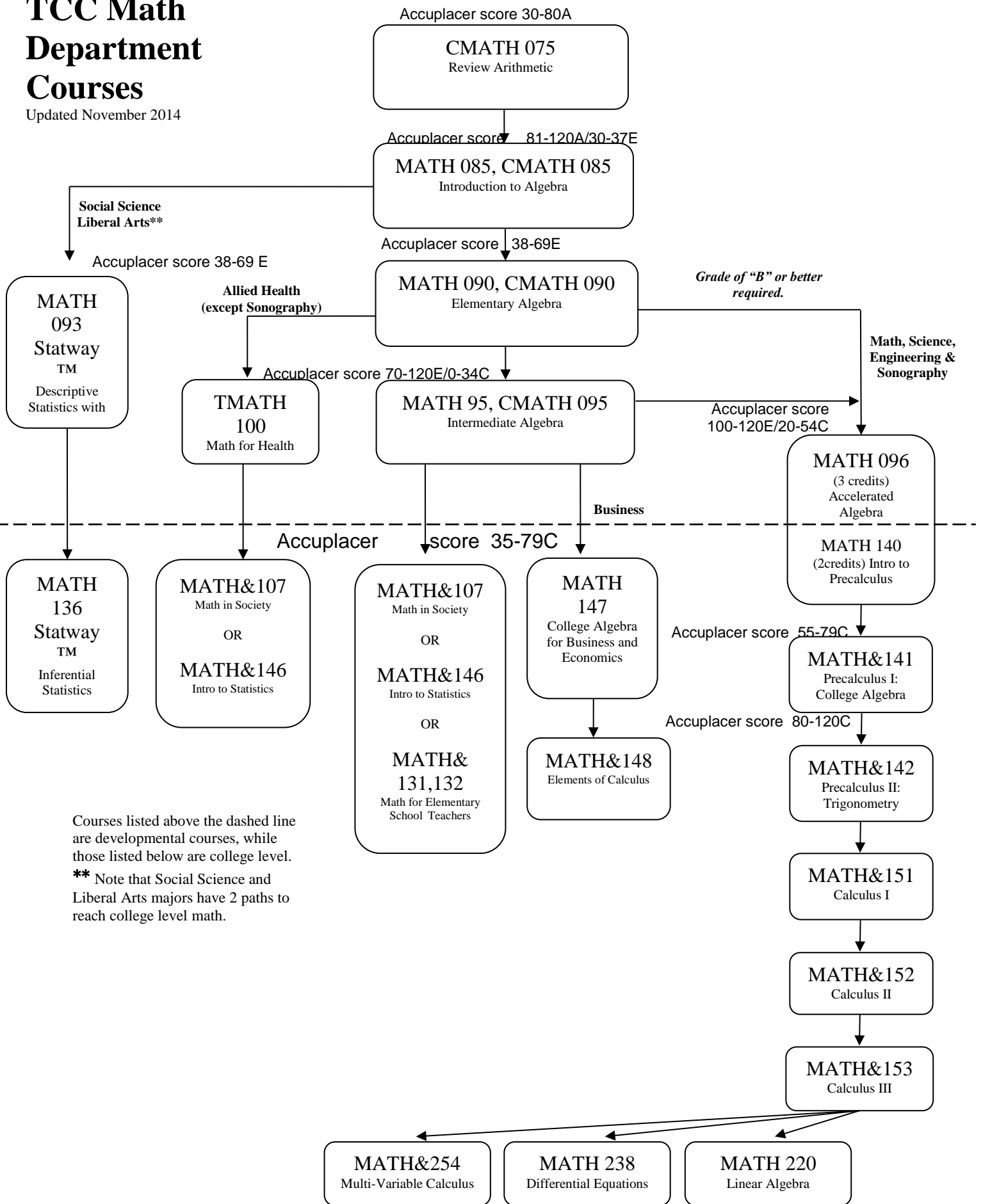
This review is for levels of math from Arithmetic through Intermediate Algebra, Accelerated Algebra, and Introduction to Precalculus. Choose the problems appropriate to your level of skill and note that the answers are located at the back.

While you are taking the Accuplacer placement test, you will be provided with a basic skills calculator. However, you are encouraged to practice doing basic arithmetic problems without a calculator.

Questions? Email a math department representative at MARC@tacomacc.edu.

TCC Math Department Courses

Updated November 2014



Courses listed above the dashed line are developmental courses, while those listed below are college level.
 ** Note that Social Science and Liberal Arts majors have 2 paths to reach college level math.

Part I: Material Covered in Math 75 - Arithmetic

Math 75 covers the following topics: operations with whole numbers, fractions, decimals, ratios and proportions, and percents.

Operations with Fractions

1. Reduce the fraction to lowest terms: $\frac{28}{42}$

a. $\frac{14}{21}$

b. $\frac{4}{6}$

c. $\frac{2}{3}$

d. $\frac{7}{10}$

2. Find the product: $\frac{7}{16} \times \frac{24}{35}$

a. $\frac{3}{10}$

b. $\frac{31}{51}$

c. $\frac{595}{384}$

d. $\frac{384}{595}$

3. Divide: $\frac{4}{7} \div \frac{3}{4}$

a. $\frac{3}{7}$

b. $\frac{16}{21}$

c. $\frac{7}{3}$

d. $\frac{21}{16}$

4. Multiply: $\left(3\frac{1}{4}\right)\left(6\frac{2}{3}\right)$

a. $18\frac{1}{6}$

b. $13\frac{3}{4}$

c. $18\frac{1}{4}$

d. $21\frac{2}{3}$

5. Subtract: $\frac{11}{15} - \frac{1}{2}$

a. $\frac{10}{13}$

b. $\frac{7}{30}$

c. $\frac{7}{15}$

d. $\frac{10}{17}$

6. Find the sum: $3\frac{3}{5} + 2\frac{2}{3}$

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

b. $5\frac{5}{15}$

c. $6\frac{4}{15}$

d. $6\frac{6}{15}$

Operations with Decimals

7. Add: $4.23 + 3.7 + 2.006$

a. 24.66

b. 9.36

c. 9.936

d. 9.306

8. Write $\frac{17}{10}$ as a decimal number.

a. .17

b. 1.7

c. 17

9. Round 1928.956 to the tenths place.

a. 1928.9

b. 1929.0

c. 1928.95

d. 1928.96

10. If one square yard of carpet costs \$15.45, how much will 45.5 square yards cost?

a. \$702.98

b. \$2.95

c. \$7029.75

d. \$70.30

11. If Angie's gross pay for 21.5 hours was \$141.04, what was her pay per hour?

a. \$15.24/hr

b. \$6.72/hr

c. \$6.56/hr

d. \$7.29/hr

Operations with Ratios and Proportions

12. Two inches on a map equals 10 miles. Write the ratio of map inches to miles.

a. 5

b. $\frac{1}{5}$

c. 20

d. $\frac{1}{2}$

13. Find the missing part of the proportion: $\frac{12}{x} = \frac{3}{7}$

a. 36

b. 24

c. 21

d. 28

14. If it takes Tom 48 minutes to walk 3 miles, how many minutes will it take him to walk 5 miles?

a. 16 min.

b. 144 min.

c. 15 min.

d. 80 min.

Operations with Percentages

15. Change the percent to a fraction: 145%

a. $\frac{29}{20}$

b. $\frac{29}{2}$

c. $\frac{29}{50}$

d. $\frac{29}{5}$

16. Change the decimal number to a percent: .129

a. 1.29%

b. 12.9%

c. 129%

d. .129%

17. The 1980 Census Report listed the population of Pullman as 17,316. The 1990 Census Report listed the population as 18,373. Find the percent change in the population. Round the percent to the nearest tenth.

a. 4.9%

b. 5.75%

c. 6.1%

d. 6.7%

18. Frost's Refrigeration decided to increase their basic service call charge by 8%. What will be the new charge for a service call if they had been charging \$42.50?

a. \$44.80

b. \$45.00

c. \$45.20

d. \$45.90

Part II: Material Covered in Math 85 - Introduction to Algebra

Math 85 covers the following topics: introduction to variables and signed numbers, solutions to linear equations and inequalities, simplification of algebraic expressions, evaluation and manipulation of formulas, an emphasis on word problems and graphing of linear equations.

Operations with Signed Numbers

19. Simplify: $(5 - 2) - (2 - 5)$

a. 3

b. 0

c. 6

d. -6

20. Simplify: $-11 - (-3) + (-1) - 9$

a. -18

b. -22

c. -24

d. -16

21. Simplify: $\frac{9 + 21}{3} - \frac{12(4)}{2}$

a. -14

b. -16

c. $-\frac{18}{5}$

d. -1

Variables

22. Translate to an algebraic expression: Twice the sum of $3x$ and y

- a. $2(3x) + y$ b. $6x + 2y$ c. $3x + 2y$ d. $2 + 3x + y$

23. Evaluate: $(x - 3y)(2x + y)$ when $x = -2$ and $y = -1$

- a. 25 b. -25 c. -3 d. -5

24. Simplify: $6x - 7b - 10x + 11b$

- a. $-x + b$ b. $-4x + 4b$ c. $4x - 4b$ d. $-4x - 4b$

25. Simplify: $3(x + 1) - 4(x - 1)$

- a. $-x - 7$ b. $-x - 1$ c. $-x + 7$ d. $-x + 1$

26. Multiply: $\left(\frac{4a}{9b}\right)\left(-\frac{3b}{16a}\right)$

- a. $\frac{ab}{12ab}$ b. $\frac{1}{12}$ c. -12 d. $-\frac{1}{12}$

27. Simplify: $2[9x - 2(3x - 2)]$

- a. $6x - 2$ b. $6x - 4$ c. $6x + 4$ d. $6x + 8$

Solutions to Linear Equations and Inequalities

28. Solve: $-2x + 21 = -11$

- a. -5 b. -16 c. 16 d. 5

29. Solve: $\frac{2x}{3} = \frac{4}{5}$

- a. $\frac{6}{5}$ b. $\frac{8}{15}$ c. $\frac{12}{5}$ d. $\frac{20}{15}$

30. Solve: $2x + 6 > 3x + 32$

- a. $x > -26$ b. $x > -38$ c. $x < -26$ d. $x < 26$

31. Solve: $6(x - 5) - 3x = -9$

a. -13

b. 7

c. 13

d. -7

Operations with Positive Integer Exponents

32. Simplify: $2^2 - (-2)^3$

a. -2

b. 12

c. 10

d. 14

33. Simplify: $(2 + 3)^2 - (2 + 3^2)$

a. 14

b. 0

c. 2

d. 32

Solving Basic Word Problems

34. A board is 28 feet long and is cut into three pieces. The second piece is twice as long as the first piece and the third is three feet longer than the second. What is the length of each piece?

a. $5, 10, 13$

b. $4, 8, 16$

c. $6, 12, 10$

d. $8, 16, 4$

35. The perimeter of a rectangle is 66 feet and the width is 7 feet. What is the length in feet?

a. 26

b. 52

c. 40

d. 20

36. The area of a triangle is 24 square feet. If the base is 12 feet, what is the height of the triangle?

a. 4

b. 2

c. 8

d. 6

37. Seven less than four times a number is 35. What is the number?

a. 7

b. $\frac{21}{2}$

c. -7

d. $-\frac{21}{2}$

Manipulation of Formulas

38. Solve: $v = k + gt$ for t

a. $t = v + \frac{k}{g}$

b. $t = v - \frac{k}{g}$

c. $t = \frac{v+k}{g}$

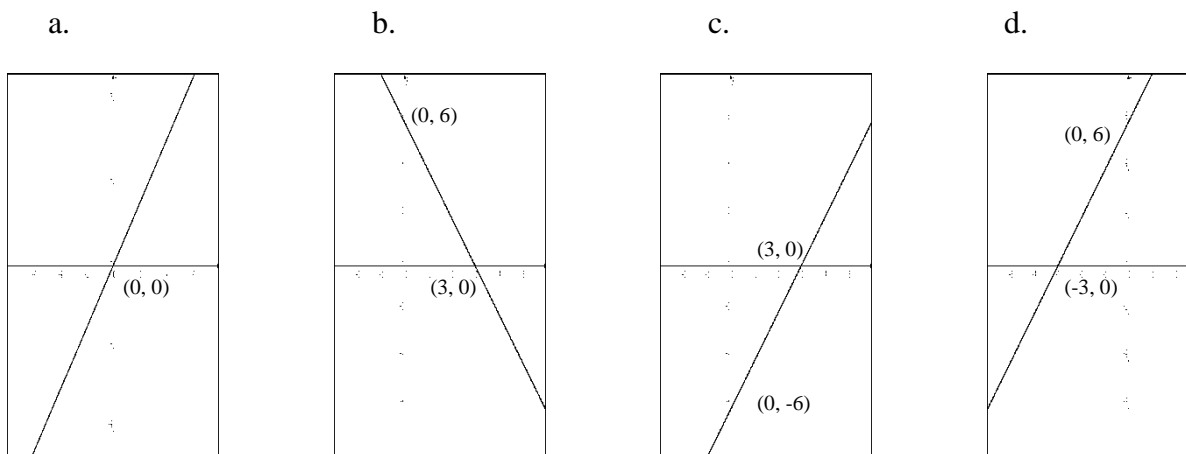
d. $t = \frac{v-k}{g}$

Part III: Material Covered in Math 90 - Elementary Algebra

Math 90 covers the following topics: linear equations, polynomials, factoring, rational expressions, graphing, and systems of equations.

Graphing of Linear Equations

39. Graph $2x - y = 6$. Indicate x- and y-intercepts (if any).



Polynomials

40. Subtract the following polynomials: $(x^5 - 3x^2 + 2x - 1) - 2(x^3 - 3x^2 - 2x + 1)$

a. $x^5 + 2x^3 + 9x^2 - 6x + 3$

b. $x^5 - 2x^3 - 9x^2 - 2x + 1$

c. $x^5 - 2x^3 + 3x^2 + 6x - 3$

d. $x^5 + 2x^3 - 3x^2 - 6x + 3$

41. Subtract $(2x + 1)$ from the sum of $(3x - 7)$ and $(5x + 2)$

a. $6x - 6$

b. $-6x + 6$

c. $4x + 10$

d. $4x - 10$

42. Multiply: $(x + 3)(5x - 1)$

a. $5x^2 + 14x - 3$

b. $5x^2 + 15x - 3$

c. $5x^2 - x - 3$

d. $5x^2 + 16x - 3$

43. If $x = -3$ and $y = 1$, evaluate: $x^2 + 2xy + 7$

a. 10

b. -5

c. 11

d. -8

44. Factor completely: $9x^2 - 25$

a. $(9x - 5)(9x + 5)$

b. $(3x - 5)(3x - 5)$

c. $(3x - 5)(3x + 5)$

d. $(3x - 5)^2$

45. Factor completely: $x^2 - 5x - 14$

- a. $(x + 7)(x - 2)$ b. $(x - 7)(x - 2)$ c. $(x - 14)(x + 1)$ d. $(x - 7)(x + 2)$

46. Factor completely: $6x^2 + 19x + 10$

- a. $(6x + 5)(x + 2)$ b. $(3x + 2)(2x + 5)$ c. $(6x + 1)(x + 10)$ d. cannot factor

47. Multiply and simplify: $\frac{x^2 - 2x - 3}{2x - 6} \cdot \frac{10}{x^2 - 1}$

- a. $\frac{5}{x - 1}$ b. 5 c. $\frac{10(x^2 - 2x - 3)}{(2x - 6)(x^2 - 1)}$ d. $\frac{x - 3}{x + 1}$

48. Add and simplify (if possible): $\frac{10}{x^2 + x - 6} + \frac{3x}{x^2 - 4x + 4}$

- a. $\frac{10 + 3x}{2x^2 - 3x - 2}$ b. $\frac{3x^2 + 19x - 20}{(x + 3)(x - 2)^2}$
c. $\frac{13x}{2x^2 - 3x - 10}$ d. $\frac{10 + 3x}{(x^2 + x - 6)(x^2 - 4x + 4)}$

49. Subtract and simplify (if possible): $\frac{x}{x^2 - 4} - \frac{1}{x + 2}$

- a. $\frac{x - 1}{x^2 - 4}$ b. $\frac{-2}{x^2 - 4}$ c. $\frac{2}{x^2 - 4}$ d. none of the above

Inequalities

50. Solve: $2x - 1 < 5x - 13$

- a. $\{x \mid x < 4\}$ b. $\{x \mid x < -4\}$ c. $\{x \mid x > -4\}$ d. $\{x \mid x > 4\}$

Exponents

51. Simplify: $(3x^{-2}y)^3(2xy)$

- a. $18x^7y^4$ b. $\frac{54y^4}{x^5}$ c. $18x^2y^5$ d. $\frac{54y^4}{x^7}$

52. Simplify: $\frac{-8a^5b^{-3}}{ab^2}$

a. $\frac{a^4}{8b^5}$

b. $\frac{-8a^6}{b}$

c. $\frac{1}{8a^4b}$

d. $\frac{-8a^4}{b^5}$

Quadratic Equations

53. Solve: $x^2 - 4x = 12$

a. $x = 12$ or $x = 16$

b. $x = 6$ or $x = -2$

c. $x^2 = 4x + 12$

d. $x = 0$

Linear Equations

54. Find the slope and the y-intercept of the line: $x + 3y = 9$

a. slope = 1; y-intercept = 9

b. slope = -3; y-intercept = 9

c. slope = -1; y-intercept = 3

d. slope = $-\frac{1}{3}$; y-intercept = 3

55. Find the slope-intercept equation of the line passing through the points (1, -3) and (3, 5)

a. $y = 4x - 7$

b. $y = x - 4$

c. $y = 4x + 13$

d. $y = \frac{1}{4}x - 7$

56. Solve for P : $P = A - Prt$

a. $P = A - Prt$

b. $P = \frac{A}{rt}$

c. $P = \frac{A}{1 + rt}$

d. $P = \frac{A}{2rt}$

Systems of Equations in Two Variables

57. Solve the following linear system: $3x + 2y = 9$ and $4x + 5y = 5$

a. $x = 0, y = 1$

b. $x = -5, y = 3$

c. $x = 3, y = 0$

d. $x = 5, y = -3$

58. Michael has a number of dimes and quarters totaling \$12.05. The number of quarters is five more than twice the number of dimes. How many coins of dimes does he have?

a. 20 dimes

b. 18 dimes

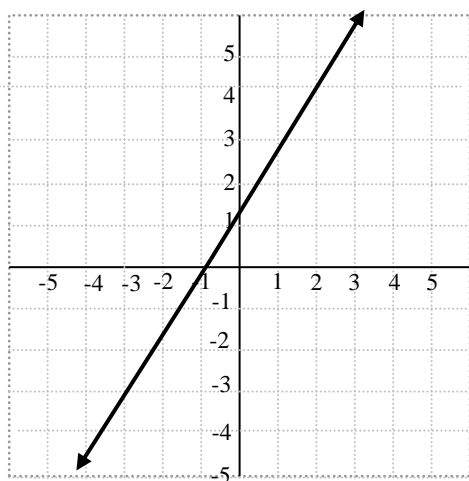
c. 100 dimes

d. 5 dimes

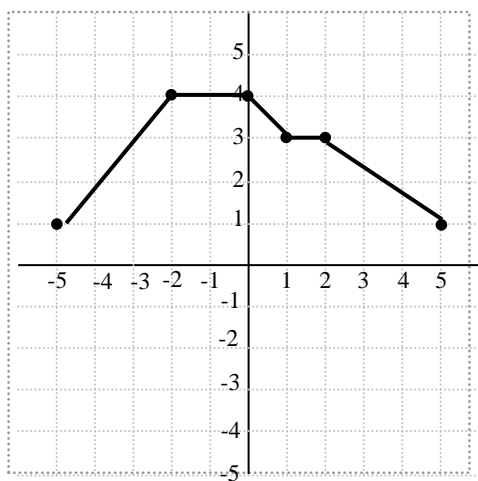
Part IV: Material covered in Math 95 - Intermediate Algebra

Math 95 covers the following topics: introduction to functions; linear, quadratic, exponential and logarithmic functions and their applications; systems of linear equations and inequalities and their applications; rational exponents and radicals.

59. Find the slope of the line pictured below.



60. Below is the graph of a function showing $y = f(x)$. Use it to answer the following questions.



- a. What is $f(-4)$?
- b. What is x if $f(x) = 1$?

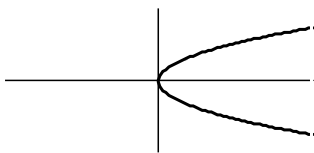
61. Find the equation in slope-intercept form of the straight line containing the point $(1, -3)$ and having the slope $-\frac{5}{2}$.

62. Let $f(x) = 2x + 3$. Find and simplify $f(t - 1)$.

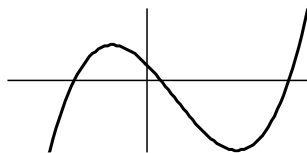
63. Factor the following polynomial or determine that the polynomial is prime: $2a^2 - 16a + 32$

64. Which of the following are graphs of functions?

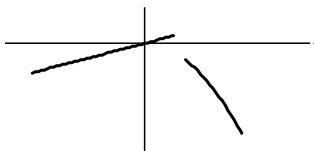
a.



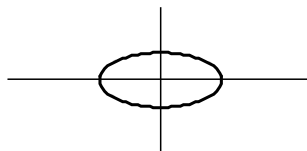
b.



c.



d.



65. Solve the given inequality and graph the solution set on a number line: $2x - 3 \geq 9 + 3x$

66. Solve the system.
$$\begin{cases} 2x + y = 6 \\ 3x + 4y = 4 \end{cases}$$

67. Write using rational exponents (in lowest terms): $\sqrt[4]{5x^3y^2}$

68. Simplify. Assume that b represents a non-negative number. $-3\sqrt{b^5} + b\sqrt{b^3} + \sqrt{b^2}$

69. Rationalize the denominator: $\frac{\sqrt{2}}{\sqrt{2} + \sqrt{5}}$

70. Simplify. Do **not** assume that x represents a non-negative number. $\sqrt[4]{32x^6}$

71. Solve for a : $\sqrt[3]{7a - 10} = 2$

72. A bookcase is 1 foot taller than it is wide. A diagonal brace, 1 foot longer than the height of the bookcase, is needed for support. What is the length of the brace?

73. Solve for x : $x^2 + 6x = 1 + x^2$

74. Let $f(x) = -x^2 + 6x - 8$. Find the vertex and x - and y -intercepts of the graph of f .

75. A ball is tossed in the air. Its distance in feet above ground t seconds later is given by the formula $d(t) = 6 + 96t - 16t^2$. What is the ball's maximum height?

76. Let $g(x) = \left(\frac{1}{2}\right)^x$. Find $g(-3)$.

77. Solve. $\log_2 16 = x$

78. Solve. $\log_x 8 = 1$

Part V: Material covered in Math 96/140 – Accelerated Algebra & Introduction to Precalculus

Math 96/140 is a linked course in which a student earns 3 precollege level credits and 2 college level credits in a single quarter.

Math 96 covers the following topics: A survey of algebraic concepts and skills intended for students majoring in math, science, or engineering. Topics include linear, quadratic, and radical functions, simplifying expressions, and solving equations. This course integrates the necessary algebraic skills and concepts into MATH-140.

Math 140 covers the following topics: This course integrates analytic geometry concepts into MATH-096 Accelerated Algebra. Topics include 1-dimensional and 2-dimensional coordinate geometry, parameterized families of functions and their graphs.

79. Solve.

a) $100x^2 + 36 = 0$ (your answer should be in terms of i)

b) $3x^2 = 2 - 2x$

c) $x^{2/3} - 6x^{1/3} + 8 = 0$

d) $\sqrt{2x+2} - x + 3 = 0$

e) $4 \leq 2x + 5 \leq 9$

f) $|x - 10| > 4$

80. If $f(x) = \frac{2}{x} + \frac{2}{x+3}$, then find x such that $f(x) = 1$.

81. Find the domain of the given functions.

a) $f(x) = \sqrt{2x + 5}$

b) $g(x) = \sqrt[3]{x + 1}$

c) $h(x) = \frac{x+1}{2x^2-5x+3}$

82. The value of a car usually varies inversely with its age. If a car is worth \$7,000 when it is 9 years old, then how much will it be worth when it is 13 years old?

83. Simplify. Assume that the variables can represent any real number.

a) $\sqrt{16y^4}$

b) $\sqrt{a^2 + 6a + 9}$

c) $\sqrt[3]{\frac{125x}{x^7}}$

d) $(-9y^9)^{2/3}$

e) $\sqrt[4]{a^5} \cdot \sqrt[3]{a^7}$

f) $\left(\frac{25}{121}\right)^{-3/2}$

g) $\frac{(3x^{2/3}y^{3/4})(2x^{-1/3})^4}{y^{-13/4}}$

84. Add or subtract.

$$\sqrt{y^5} - \sqrt{9y^5} - \sqrt{25y^5}$$

85. Simplify the complex fraction.

a) $\frac{\frac{3x}{y}}{\frac{9xz}{y^2}}$

b) $\frac{1+\frac{1}{x}}{1-\frac{1}{x^2}}$

86. Consider the quadratic function $f(x) = x^2 + 2x - 3$.

- Find the vertex.
- Find the equation of the axis of symmetry.
- Find the x and y -intercepts.

87. A parabola has vertex $(-9,2)$ and passes through the point $(-5,10)$. Find the rule of the quadratic function in vertex form.

88. Rationalize the denominator. $\frac{2\sqrt{5}}{x-\sqrt{2}}$

89. Let $f(x) = \begin{cases} x^2 + 1, & \text{if } x < 5 \\ x, & \text{if } 5 \leq x < 7 \\ -x, & \text{if } x \geq 7 \end{cases}$

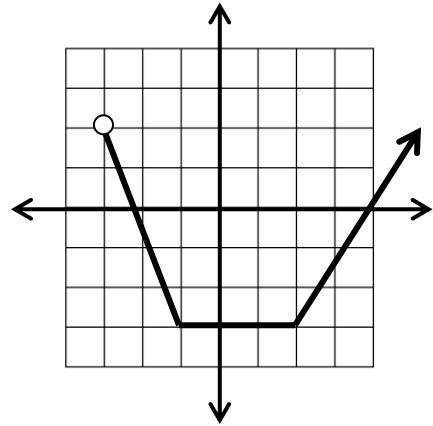
- Find $f(-10)$.
- Simplify $\frac{2f(6)+f(6)}{[f(8)]^2}$

90. A rectangle has perimeter 45 cm and area 112.5 cm^2 . If the length is twice the length of the width, then what are the dimensions of the rectangle?

91. Find a real number k such that $3x - ky + 2 = 0$ has a y -intercept of -3 .

92. Use the graph of the function, f , to answer the questions.

- a) $f(-3) =$
- b) $f(0) =$
- c) $f(3) =$
- d) For what value(s) of x will $f(x) = -2$?



93. Solve for the variable k : $\frac{12k}{m+k} = 3T$

94. Simplify and write the answer in interval notation.

- a) $[-5,5] \cap (0, \infty)$
- c) $(-\infty, 6) \cup [0,10]$

95. Suppose that the graph of a linear function has the property that $f(0) = -4$ and that $f(-3) = 15$. Find the rule of this linear function.

96. As a result of preservation efforts in countries in which whaling was once common, the humpback whale population has grown since the 1970's. The worldwide population $P(t)$, in thousands, t years after 1982 can be estimated by the function $P(t) = 5.5(1.047)^t$.

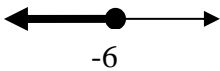
- a) What was the whale population in the year 2002?
- b) Use graphing techniques to determine the year in which the population will reach 30,000 whales.

97. Find the equation of the circle with center $(0,7)$ and radius $4\sqrt{3}$.

98. The endpoints of a circle's diameter are $(-9,4)$ and $(1,12)$. Find the center of the circle, its radius, and its equation.

Math Placement Review Guide Answer Key

Part I—Math 75	Part II—Math 85	Part III—Math 90
1. c	19. c	39. c
2. a	20. a	40. c
3. b	21. a	41. a
4. d	22. b	42. a
5. b	23. d	43. a
6. c	24. b	44. c
7. c	25. c	45. d
8. b	26. d	46. b
9. b	27. d	47. a
10. a	28. c	48. b
11. c	29. a	49. c
12. b	30. c	50. d
13. d	31. b	51. b
14. d	32. b	52. d
15. a	33. a	53. b
16. b	34. a	54. d
17. c	35. a	55. a
18. d	36. a	56. c
	37. b	57. d
	38. d	58. b

Part IV—Math 95	
59. $3/2$	70. $2 x \sqrt[4]{2x^2}$
60. a) 2 b) 5 or -5	71. $a = 18/7$
61. $y = -\frac{5}{2}x - \frac{1}{2}$	72. 5 feet
62. $2t + 1$	73. $x = 1/6$
63. $2(a - 4)^2$	74. Vertex: (3, 1)
64. b. and c.	x-int's: (2, 0) & (4, 0)
65. $x \leq -6$	y-intercept: (0, -8)
	75. 150 feet
	76. 8
66. $x = 4, y = -2$	77. $x = 4$
67. $5^{1/4}x^{3/4}y^{1/2}$	78. $x = 8$
68. $-2b^2\sqrt{b} + b$	
69. $\frac{2-\sqrt{10}}{-3}$	

Part V-Math96/140

79. a) $\pm \frac{3}{5}i$ b) $\frac{-1 \pm \sqrt{7}}{3}$ c) $x = 8, 64$ d) $x = 7$ e) $-\frac{1}{2} \leq x \leq 2$
f) $(-\infty, 6) \cup (14, \infty)$

80. $x = -2, 3$

81. a) $x \geq -\frac{5}{2}$ b) *all real numbers* c) *all real numbers, $x \neq 1, \frac{3}{2}$*

82. \$4846.15

83. a) $4y^2$ b) $|a + 3|$ c) $5/x^2$ d) $3y^6\sqrt[3]{3}$ e) $a^3\sqrt[12]{a^7}$
f) 64 g) $\frac{48y^4}{x^3}$

84. $-7y^2 \cdot \sqrt{y}$

85. a) $\frac{y}{3z}$ b) $\frac{x}{x-1}$

86. a) $(-1, -4)$ b) $x = -1$

87. $y = \frac{1}{2}(x + 9)^2 + 2$

88. $\frac{(2\sqrt{5})x + 2\sqrt{10}}{x^2 - 2}$

89. a) 101 b) $\frac{9}{32}$

90. $15\text{cm} \times 7.5\text{cm}$

91. $k = -\frac{2}{3}$

92. a) *Does not exist* b) -3 c) $f(3) \approx -1.3$ d) $x \approx -1.5, 2.5$

93. $k = \frac{3Tm}{12-3T}$

94. a) $(0, 5]$ b) $(-\infty, 10]$

95. $f(x) = -\frac{19}{3}x - 4$

96. Approximately 13,781 whales

97. $x^2 + (y - 7)^2 = 48$