

MA091 Review for Final Exam

Revised: March 2010

In problems 1-7, perform the indicated operations and simplify

- $(3x^2 - 5x + 2) + (2x^2 - 3x - 7)$
- $(5x^2 + 2x - 4) - (x^2 - x + 9)$
- $(2x + 3)(3x - 7)$
- $(5x - 8)(2x + 4)$
- $(3x - 4)(x^2 - 7x + 2)$
- $(2x - 3)^2$
- $(5x + 7)^2$

In problems 8-17, factor completely, if possible. Otherwise, write "Not Factorable".

- $12x^2 - 18x$
- $x^2 + 20x + 36$
- $x^2 + 5x - 24$
- $x^2 - x - 30$
- $9x^4 - 6x^3 - 3x^2$
- $x^2 + 36x$
- $x^2 + 36$
- $8x^3 - 50x$
- $5x^2 - 2x - 3$
- $25x^2 - 60x + 36$

In problems 18-25, use algebra to solve the equations.

- $7 - 3x = 11x + 5$
- $9 - 2(3 - x) = 15 + 4x$
- $\frac{2}{3}x + \frac{1}{2} = \frac{3}{4} - 2x$
- $3(2x - 4) + 5 = -3(x + 7) + 2x$
- $2x^2 - 18x = 0$
- $x^2 = 6x + 7$
- $x(x + 1) = 6$
- $x^2 - 9x + 20 = 0$

In problems 26-28, use the quadratic formula to solve the equations. Round the solutions to 3 decimal places.

- $x^2 + 6x + 2 = 0$
- $2x + 4 = 3x^2$
- $3x^2 - 8x - 2 = 0$

In problems 29-31, solve each inequality and graph the solution

29. $3x + 8 < 20$

30. $9 - 5(x - 2) \geq 4$

31. $-6x + 2 \geq -2x + 18$

In problems 32-43, simplify the expression where possible. Express answers without using negative exponents.

32. x^5x^4

33. $(x^5)^4$

34. $x^5 + x^4$

35. $(-2x)^3$

36. $-2x^3$

37. $-2x^{-3}$

38. $3x^0$

39. $(3x)^0$

40. $\frac{x^2y^4}{x^7y}$

41. $\frac{x^{-2}}{x^{-5}}$

42. $(x^{-2}y^3)^{-4}$

43. $\frac{3x^5y^4}{9x^2y^5}$

44. Convert to scientific notation

a. 0.00000074

b. 346.5

45. Convert to standard notation

a. 2.3×10^{-4}

b. 1.437×10^6

46. Evaluate $2y^3 - 3y^2 - y$ for $y = -3$

47. Evaluate $x^0 + x^{-1}$ for $x = 4$

48. Solve for x : $A = S + Skx$

49. Solve for y : $ax + by = c$

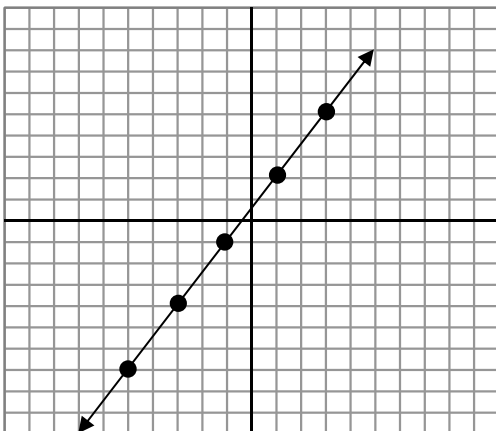
50. Given $A = \frac{h(B+b)}{2}$

a. Find the value of A if $h = 50$, $B = 3$ and $b = 7$.

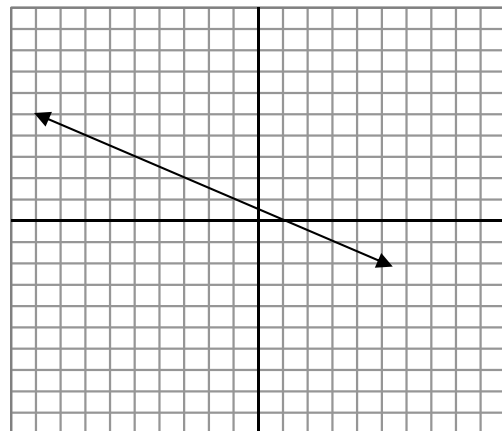
b. Find the value of B if $A = 36$, $h = 6$ and $b = 5$.

51. Using the graphs below, find the slope of each line

a.



b.



52. Write the equation in $y = mx + b$ form and find the slope and the y -intercept

$$3x - 2y = -18$$

line: _____

Slope: _____

y -intercept: _____

53. Write the equation in $y = mx + b$ form and find the slope and the y -intercept

$$-4x - 3y = 8$$

line: _____

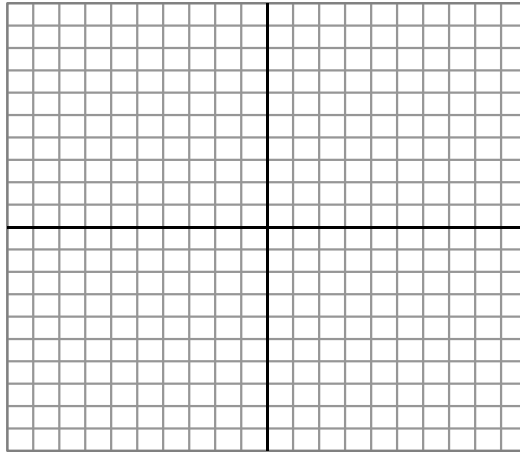
Slope: _____

y -intercept: _____

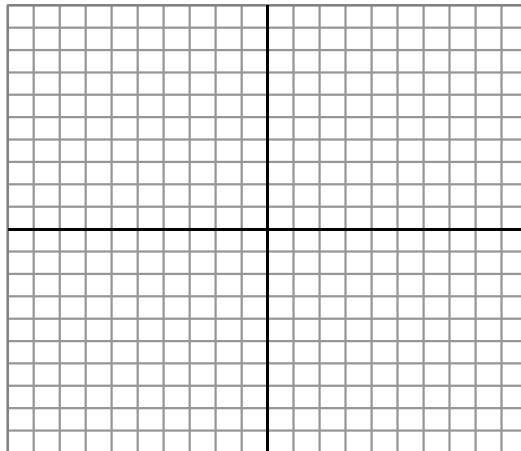
54. Find the slope of the line through $(-2, -5)$ and $(4, -8)$.

55. Find the x and y intercepts and sketch the graph of:

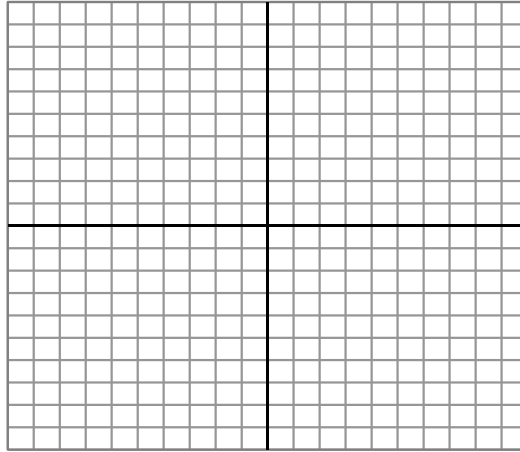
$$4x - 3y = 12$$



56. Sketch the graph of $y = 3x + 2$



57. Sketch the graph of $y = -2x + 4$



58. Find the equation of the line with a slope of 2 and containing the point $(3, -1)$.

59. Find the equation of the line with a slope of -3 and containing the point $(2, -4)$.

60. Find the equation of the line containing the points $(4, -1)$ and $(2, 7)$.

61. Find the equation of the line containing the points $(-3, 13)$ and $(2, -2)$.

62. Determine whether these lines are parallel or not parallel:
 $y = 5x - 7$
 $10x - 2y = 15$

63. Determine whether these lines are parallel or not parallel:
 $x - y = 2$
 $x - 3y = 2$

64. Solve the following system of equations:

$$\begin{aligned} 2x + 5y &= 1 \\ 3x - 4y &= 36 \end{aligned}$$

65. Solve the following system of equations:

$$\begin{aligned} 3x - y &= 11 \\ 5x + 4y &= 7 \end{aligned}$$

66. The base of a triangle is 5 cm greater than the height. The area is 42 cm^2 . Find the height and base.

67. The perimeter of a rectangle is 98 cm. The length is 7 cm less than 3 times the width. What are the dimensions of the rectangle?

68. The length of a rectangular garden is 6 meters greater than the width. The area of the rectangle is 135 m^2 . Find the length and width.

69. The height in feet of an object t seconds after it is thrown upward is given by $h = -16t^2 + 64t$. After how many seconds will the height of the object be 48 ft? There are two solutions, one on the way up and one on the way down.

70. The window ledge is 17 feet above the ground. Your ladder is 20 feet long. How far away from the building must you place your ladder so that it will just rest on the window ledge? Round your answer to the nearest tenth of a foot.

71. Suppose 850 tickets are sold for a game for a total of \$1100. If adult tickets cost \$1.50 and children's tickets cost \$1.00, how many of each kind of ticket were sold?

72. One group of students goes to the campus cafeteria and buys 2 slices of pizza and 3 sodas and pays \$10.50. Another group of students goes to the cafeteria and buys 3 slices of pizza and 5 sodas and pays \$16.50. What is the cost of each item?

Answer Key

1. $5x^2 - 8x - 5$

2. $4x^2 + 3x - 13$

3. $6x^2 - 5x - 21$

4. $10x^2 + 4x - 32$

5. $3x^3 - 25x^2 + 34x - 8$

6. $4x^2 - 12x + 9$

7. $25x^2 + 70x + 49$

8. $6x(2x - 3)$

9. $(x + 18)(x + 2)$

10. $(x + 8)(x - 3)$

11. $(x - 6)(x + 5)$

12. $3x(3x + 1)(x - 1)$

13. $x(x + 36)$

14. Not Factorable

15. $2x(2x - 5)(2x + 5)$

16. $(5x + 3)(x - 1)$

17. $(5x - 6)^2$

18. $x = \frac{1}{7}$

19. $x = -6$

20. $x = \frac{3}{32}$

21. $x = -2$

22. $x = 0$ and $x = 9$

23. $x = 7$ and $x = -1$

24. $x = -3$ and $x = 2$

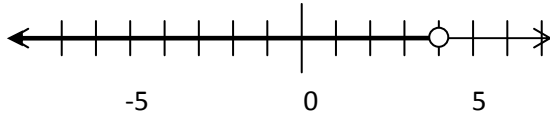
25. $x = 4$ and $x = 5$

26. $x = -5.646$ and $x = -.354$

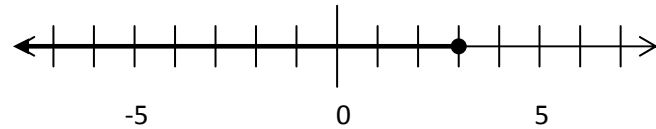
27. $x = -.869$ and $x = 1.535$

28. $x = -.230$ and $x = 2.897$

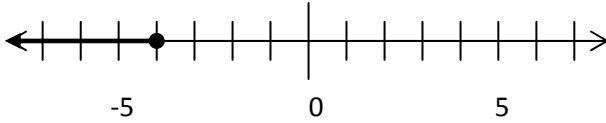
29. $x < 4$



30. $x \leq 3$



31. $x \leq -4$



32. x^9

33. x^{20}

34. $x^5 + x^4$

35. $-8x^3$

36. $-2x^3$

37. $-\frac{2}{x^3}$

38. 3

39. 1

40. y^3/x^5

41. x^3

42. x^8/y^{12}

43. $x^3/3y$

44. a. 7.4×10^{-7}

b. 3.465×10^2

45. a. 0.00023

b. 1,437,000

46. -78

47. $\frac{5}{4}$ or $1\frac{1}{4}$ or 1.25

48. $x = \frac{A-S}{Sk}$

49. $y = \frac{-ax+c}{b}$ or $y = -\frac{a}{b}x + \frac{c}{b}$

50. a. $A = 250$

b. $B = 7$

51. a. $\frac{3}{2}$

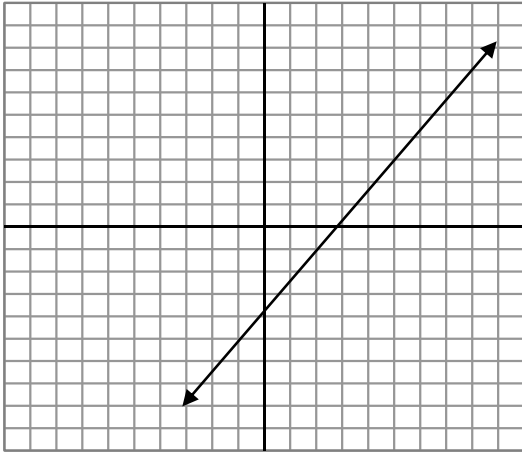
b. $-\frac{1}{2}$

52. Line: $y = \frac{3}{2}x + 9$, Slope: $\frac{3}{2}$, y-intercept: (0,9)

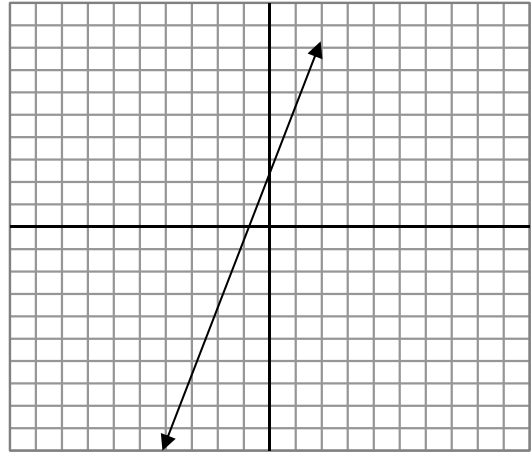
53. Line: $y = -\frac{4}{3}x - \frac{8}{3}$, Slope: $-\frac{4}{3}$, y-intercept: $(0, -\frac{8}{3})$

54. $m = -\frac{1}{2}$

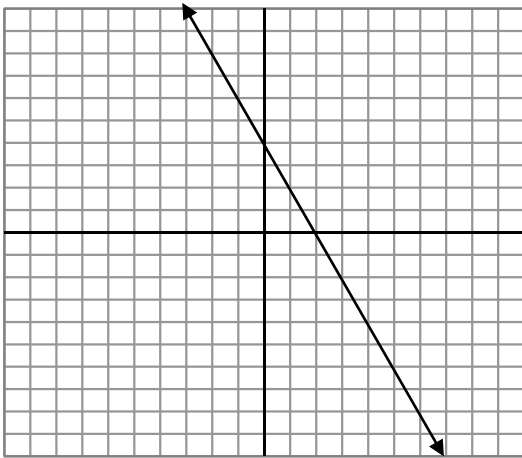
55.



56.



57.



58. $y = 2x - 7$

59. $y = -3x + 2$

60. $y = -4x + 15$

61. $y = -3x + 4$

62. Parallel

63. Not Parallel

64. $x = 8, y = -3$

65. $x = 3, y = -2$

66. Base = 12 cm, Height = 7 cm

67. Width = 14 cm, Length = 35 cm

68. Width = 9 m, Length = 15 m

69. $t = 1$ sec and $t = 3$ sec

70. 10.5 ft

71. 500 adults, 350 kids

72. Pizza is \$3, Soda is \$1.50