MATH 100
Final Exam Study Guide

Name:
Phone:
Email:

No Graphing Calculators Allowed!
Use Algebraic Notation AND Show All of Your Work

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1. Simplify: $9-5\left[8-\left(3y-4\right)\right]$

2. Simplify: $4\left(6x^2-5\right)-\left[3\left(5x^2-1\right)+7\right]$

*Evaluate using the **ORDER OF OPERATIONS (**show the steps clearly using correct algebraic notation**)**.*

3. Evaluate: $\left[11-4\left(2-3^3\right)\right]\div 37$

4. Evaluate: $10^2-100\div 5^2\cdot 2-3$

Evaluate the following expression for the given value of the variable.

5. $-2x^2-11x;\ \ x=-3$

6. $5y^3-3y^2+7y;\ \ y=-2$

*Solve each equation. State the **solution set**.*

7. $13-2r+2+6r-3r-2r-1=3+2\cdot 9$

8. $26-8s=20-7s$

9. $-9x-2=4-6x$

10. $-5+2\left(z+3\right)=5z-3\left(z+1\right)$

11. $24-7\left(3y-2\right)=5-6\left(2y-1\right)$

12. $\dfrac{3x}{5}-\dfrac{x}{10}=x+\dfrac{5}{2}$

13. After a 35% reduction, you purchase a television for $780. What was the television's price before the reduction? *(Define a variable, create an equation, solve using algebra, and answer in a sentence.)*

14. A rectangular field has a perimeter of 1040 feet. The length is 200 feet more than the width. Find the width and the length of the field. *(Draw a diagram of the situation, define a variable, create an equation, solve using algebra, and answer in a sentence.)*

15. One angle of a triangle is three times as large as the smallest angle. The measure of the third angle is 30° more than that of the smallest angle. Find the measure of each angle. *(Draw a diagram of the situation, define a variable, create an equation, solve using algebra, and answer in a sentence.)*

Solve the following inequality, and state the solution set. Graph this solution set on a number line.

16. $3-7x \le 17$

17. $2y-5 > 5y-11$

18. $7-2(x-4) \ge 5(1-2x)$

Graph by plotting points.

19. $2x-3y=-6$

Find the x- and y-intercepts, then graph the equation.

20. $-5x+3y=15$

21. Find the **slope** of the line through $(-14,-4)$ and $(-2,4)$.

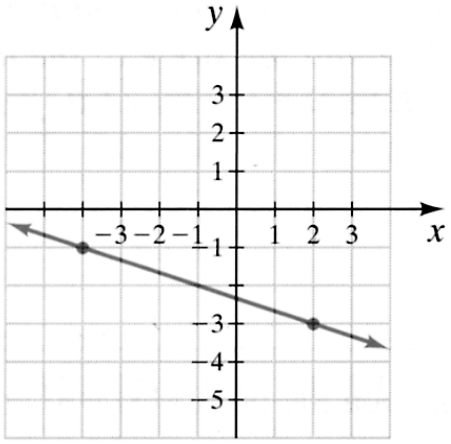
*Determine the **slope** and **y-intercept** of the line represented by the following equation. Graph the line by using the slope and y-intercept.*

22. $-2x=5y+10$

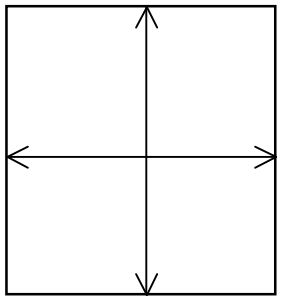
*From the graph below, write the equation of the line with the given properties, in **slope-intercept** form.*

23. Through $(-14,-4)$ and $(-2,4)$

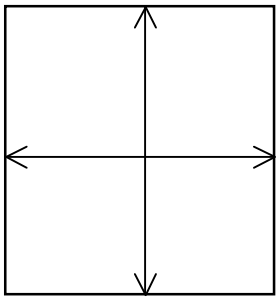
24.



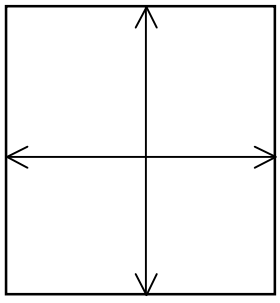
25. Graph examples of lines that show four different types of slopes.



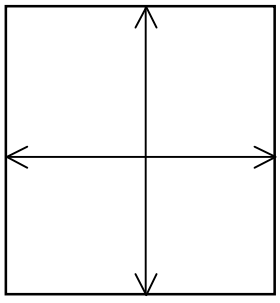
Positive slope



Negative slope



Zero slope



Undefined Slope

Solve the following systems. State the ***solution set.***

26. $\begin{cases} -2x+y=-1 \\ x-2y=-4 \end{cases}$

27. $\begin{cases} -6x+2y=-2 \\ -3x+y=2 \end{cases}$

28. $\begin{cases} 2y=x-4 \\ 3x-6y=12 \end{cases}$

29. You invest \$20,000 in two accounts paying 7% and 9% annual interest, respectively. If the total interest earned for the year is \$1,550, how much is invested at each rate? *(Define two variables, set-up an organizational structure, create a system of equations, solving using one of the algebraic techniques from Chapter 4, and answer in a sentence.)*

30. One Kung Pao chicken and two Big Macs provide 2620 calories. Two Kung Pao chickens and one Big Mac provide 3740 calories. Find the caloric content of each item. *(Define two variables, create a system of equations, solving using one of the algebraic techniques from Chapter 4, and answer in a sentence.)*

31. You invest \$20,000 in two accounts paying 7% and 8% annual interest, respectively. If the total interest earned for the year is \$1,520, how much is invested at each rate? *(Define two variables, set-up an organizational structure, create a system of equations, solving using one of the algebraic techniques from Chapter 4, and answer in a sentence.)*

32. A candy company needs to mix a 25% fat content chocolate with a 35% fat content chocolate to obtain 40 pounds of a 32% fat content chocolate. How many pounds of each kind of chocolate must be used? *(Define two variables, set-up an organizational structure, create a system of equations, solving using one of the algebraic techniques from Chapter 4, and answer in a sentence.)*

33. A boat's crew rowed 16 kilometers downstream, with the current, in 2 hours. The return trip upstream, against the current, covered the same distance, but took 4 hours. Find the crew's rowing rate in still water and the rate of the current. *(Draw a diagram of the situation, define two variables, set-up an organizational structure, create a system of equations, solving using one of the algebraic techniques from Chapter 4, and answer in a sentence.)*

34. Subtract: $\left(-8x^4y^3+5x^3y^2-7y\right)-\left(3x^4y^3-5x^3y^2-8y+9x\right)$

35. Subtract: $\left(-13x^4+8x^2-6x\right)-\left(-18x^4-18x^2+7x\right)$

36. Simplify: $\left(-2x^{12}\right)^5$

37. Multiply: $\left(4z^5\right)\left(-6z^8\right)\left(5z^9\right)$

38. Multiply: $-6w^4\left(3w^5-2w^3-7\right)$

39. Multiply: $4ab^4\left(11a^5b^3+9ab\right)$

40. Multiply: $\left(3y-4\right)\left(2y+5\right)$

41. Multiply: $\left(3x-1\right)\left(5x^2-3x+2\right)$.

42. Multiply: $\left(6x^4-7\right)\left(5x^3-8\right)$

43. Multiply: $\left(3y-\frac{1}{3}\right)^2$

44. Multiply: $\left(5x^2-3\right)^2$

45. Simplify: $\left(\frac{-x^5y^7}{3z}\right)^4$

46. Divide: $\frac{49y^6-28y^4+70y^3}{-7y^3}$

47. Divide: $\frac{2x^2-13x+21}{x-3}$

48. Simplify: $\left(\frac{12x^5}{4x^2}\right)^{-4}$

49. Simplify: $\left(3a^{-5}b^6\right)^{-4}$

Factor each polynomial using the greatest common factor. If there is no common factor other than 1 and the polynomial cannot be factored, so state.

50. $18x^3y^2-12x^3y+24x^2y^2$

Factor by grouping.

51. $x^3+6x^2-2x-12$

Factor each polynomial completely, or state that the polynomial is prime.

52. $y^2+5y-24$

53. $-3w^4-54w^3-135w^2$

54. $3r^3-9r^2-54r$

55. $48a^4-3a^2$

Use factoring to solve each quadratic equation. State your result in a ***solution set****.*

56. $3x^2=15-4x$

57. $x(3x-8)=-5$

58. $(5x+4)(x-1)=2$

59. The length of a rectangular garden is 5 feet greater than the width. The area of the rectangle is 300 square feet. Find the length and the width. *(Draw a picture, define a variable, create an equation, solve using algebra, and answer in a sentence.)*

60. A model rocket is launched from a height of 80 feet. The formula $h=-16t^2+64t+80$ describes the rocket's height, h, in feet, t seconds after it was launched. How long will it take the rocket to reach the ground? *(Create an equation, solve using algebra, and answer in a sentence.))*

61. Find all numbers for which $\dfrac{7x-28}{8x-40}$ is undefined.

62. Find all numbers for which $\dfrac{x}{x-7}$ is undefined.

63. Simplify: $\dfrac{x^2-1}{x^2+2x+1}$

64. Simplify: $\dfrac{x+2}{x^2-x-6}$

65. Simplify: $\dfrac{x^2-5x+6}{x^2-4}\bullet\dfrac{x^2-1}{x^2-2x-3}$

66. Simplify: $\dfrac{3y^2+17y+10}{3y^2-22y-16}\bullet\dfrac{y^2-4y-32}{y^2-8y-48}$

67. Simplify: $\dfrac{4x^2+10}{x-3}\div\dfrac{6x^2+15}{x^2-9}$

68. Simplify: $\dfrac{y^2+5y+4}{y^2+12y+32}\div\dfrac{y^2-12y+35}{y^2+3y-40}$

69. Simplify: $\dfrac{5x+1}{x^2-9}-\dfrac{4x-2}{x^2-9}$

70. Simplify: $\dfrac{2x+3}{3x-6}-\dfrac{3-x}{3x-6}$