MAT 1033C
Final Exam
topics guide
(Kincade)

18 multiple choice
22 short answer

Fall 2008

① factor

② solve linear equation

③ multiply exponents (+/−)

④ divide rational expressions

⑤ find slope of a line —— given an equation
given 2 points

⑥ equation of a line

⑦ evaluate a function (ex. f(7) when f(x) = x+4)

⑧ domain & range

⑨ solve and graph an inequality

⑩ √ and imaginary numbers

⑪ area and perimeter

⑫ mixture problems

⑬ fractional exponents

⑭ solve equations with fractions

⑮ graph a line

⑯ parallel & perpendicular lines

⑰ does a graph represent a function

18. graph a parabola

19. consecutive integers (odd/even)

20. systems of equations (2x2)

21. operations with radicals
$(+ - \cdot \div)$

22. rationalize

23. equation with radicals

24. solve quadratic equations

25. right triangles / pythagorean theorem

26. operations with rational expressions
$(+ - \cdot \div)$

27. divide polynomials (long or synthetic)

28. work problems

29. x-intercepts
y-intercepts

1. Simplify: $(-2)^4$

2. Simplify: $\dfrac{3a^0 - b^0}{3b^0}$

3. Simplify: $\left(\dfrac{2xy^4}{x^{-3}y}\right)^{-2}$ Write your answer without negative exponents.

4. Solve: $-2(x-3) = 3(2x-6)$

5. Solve: $\dfrac{2x}{3} - \dfrac{x}{4} = 5$

6. Give the degree of $P(x) = -x^4 + 3x - 1$

7. Let $Q(x) = -2x^4 - 3x + 17$. Find and simplify: $Q(0)$.

8. Simplify: $\left(6y^3 - 4y^2 + y\right) - \left(-4y^2 + 3y - 1\right) + \left(y^3 + 4\right)$

9. Multiply: $-3abc^3\left(4abc - c^2\right)$

10. Write $(x - 4y)^2$ without using parentheses.

11. Multiply $(3x + 7)(2x - 5)$

12. $x + 2\overline{)4x^3 + 8x^2 - 6x}$

13. Factor completely: $64a^3b^2 + 16a^4b - 4a^3b^3$

14. Factor completely: $2y^2 - 98$

15. Factor completely: $16a^3 + 54b^3$

16. Factor completely: $xy^2 - 4x + 3y^2 - 12$

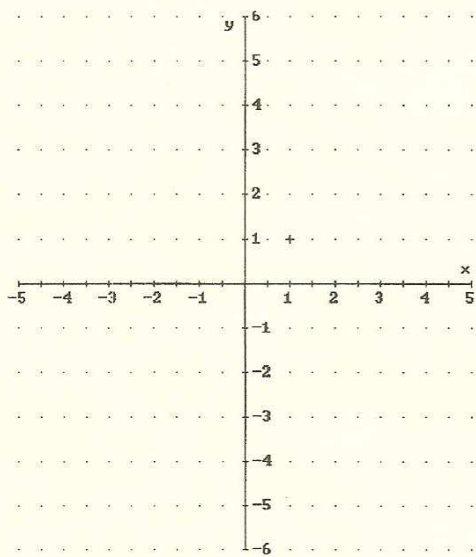17. Factor completely: $x^2 - 3x - 18$

18. Factor completely: $-12+6x^2-21x$

19. Solve: $6x^2-3x=0$
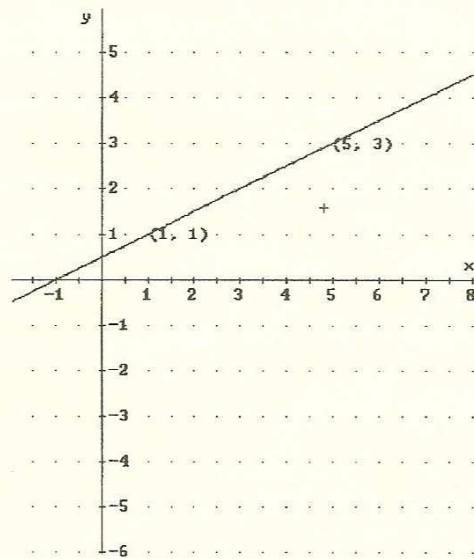
20. Solve: $x(x-5)=6$

21. Simplify: $-\dfrac{64x^4y^8}{24x^3y^{10}}$

22. Simplify: $\dfrac{\dfrac{6x}{5y}}{\dfrac{x}{10}}$

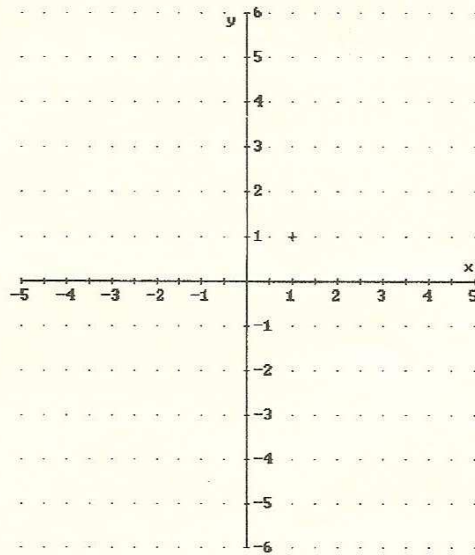23. Graph the equation: $2x+3y=12$ 24.   Find the slope of the line below.

25. The graph of the equation $7x+5y=35$ is a straight line. Find its slope and y intercept.

26. Are two lines with slopes of 4 and $-\dfrac{1}{4}$ parallel, perpendicular, or neither?

27. Write the equation of the line that has a slope of -2 and passes through the point (6, 8).

38. Simplify by rationalizing the denominator: $\dfrac{\sqrt[3]{10}}{\sqrt[3]{4}}$

39. Simplify: $\sqrt{x^2 + 8x + 16}$. (Assume $x \geq -4$)

40. Simplify and combine like terms: $\sqrt[3]{24} - 2\sqrt[3]{81}$

41. Multiply: $\left(-\dfrac{3}{4}\sqrt{3a}\right)\left(8\sqrt{12a}\right)$

42. Simplify by rationalizing the denominator: $\dfrac{3}{\sqrt{2}-1}$

43. Solve for x: $\sqrt[3]{2-x} - 3 = 0$

44. Solve for x: $\sqrt{x^2 + 5} = 5 + x$

45. Solve by factoring: $x(2x - 11) = -12$

46. Solve: $(x-2)^2 - 3 = 0$

47. Solve by completing the square: $x^2 - 6x + 11 = 0$

48. Use the quadratic formula to solve $4x^2 - 2x - 3 = 0$. Be sure to simplify all radicals and fractions.

49. Solve for z: $z^2 + 64 = 0$

50. Multiply: $\left(2 + \sqrt{-4}\right)\left(2 - \sqrt{-1}\right)$. Write your answer in $a + bi$ form.

51. Simplify: $|7-4| + |-5| - (-4)$

52. Assume that $x = 2$, $y = -3$, and $z = -1$. Evaluate $\dfrac{xy + 6z}{y(x - 2z)}$ and simplify.

53. A 200 foot rope is cut into four pieces, three of equal length, and a fourth that is twice the length of one of the others. How long is the longest piece?

54. Find the area of a rectangular pasture whose perimeter is 44 meters and whose length is 4 meters longer than it width.

28. Write the equation of the line with an x-intercept of 4 and a y-intercept of 8.

29. Write the equation of the line passing through the points (3, 4) and (-2, 4).

30. Graph the inequality $y < 2x + 3$.

31. Simplify: $\left(\dfrac{27}{125}\right)^{\frac{-2}{3}}$. Write the answer *without* negative exponents.

32. Simplify: $\left(81x^4 y^8\right)^{\frac{3}{4}}$

33. Simplify: $6^{\frac{2}{3}} * 6^{\frac{4}{3}}$

34. Simplify: $\sqrt{32m^9 n^7}$. (Assume $n \geq 0$)

35. Simplify: $\sqrt[3]{-2000x^5 y^7}$

36. Simplify: $\dfrac{\sqrt{108xy^6}}{\sqrt{3xy^2}}$

37. Simplify by rationalizing the denominator: $\dfrac{3}{\sqrt{7}}$

55. Find all solutions or state "no solution": $|5x - 3| = -4$

Perform the indicated operations and simplify if possible.

56. $\dfrac{x^2 + 2x - 3}{x^2 - 9} \cdot \dfrac{x^2 - 2x - 3}{x - 1}$

57. $\dfrac{x^2 - 9}{x^3 + 8} \div \dfrac{x - 3}{x^2 - 2x + 4}$

58. $\dfrac{4x + 2}{x - 3} - \dfrac{2x + 8}{x - 3}$

59. $\dfrac{3x - 1}{x - 4} + \dfrac{x - 1}{4 - x}$

60. $\dfrac{x + 2}{2x - 4} - \dfrac{2}{x - 2}$

61. $\dfrac{2 - \dfrac{1}{y}}{y - \dfrac{1}{2}}$

62. Solve: $\dfrac{1}{a} - \dfrac{1}{4} = \dfrac{-1}{2a}$

63. Solve: $\dfrac{1}{x + 3} = \dfrac{3}{x - 1}$

64. Solve: $1 + \dfrac{x + 2}{x + 3} = \dfrac{5}{3}$

65. Solve: $\dfrac{3x}{x - 2} - 4 = \dfrac{14 - 4x}{x - 2}$

66. One hose can fill a tank in 6 hours. If a second hose is added, the two hoses fill the tank in 4 hours. How long will it take the second hose alone to fill the tank?

67. Paula can mow a lawn in 3 hours and Bill can mow the same lawn in 2 hours. How long will it take them to mow the lawn if they work together?

68. Find the domain of the function defined by $y = \dfrac{4}{x^2}$

69. Graph the function $f(x) = x^2 + 4x + 7$ which can also be written as $f(x) = (x + 2)^2 + 3$.

70. Find the length of the hypotenuse of a right triangle with legs that are 12 cm and 5 cm long.

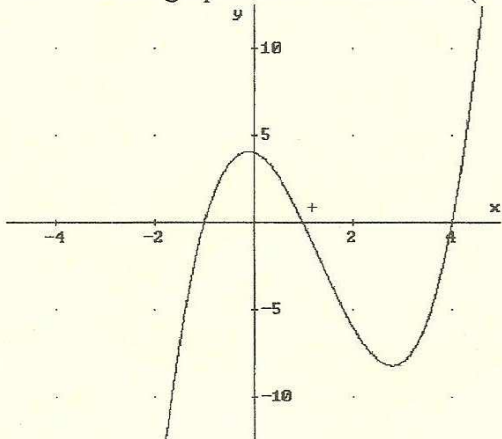71. The length of a rectangle is 12 inches and its diagonal measures 13 inches. Find the width of the rectangle.

72. Subtract: $(2 - 3i) - (3 + 4i)$

73. Simplify: $\dfrac{1 + i}{i}$

74. Simplify: $\dfrac{3+\sqrt{-1}}{2-\sqrt{-4}}$

75. Solve $A = P + PRT$ for P

76. Is the graph below a function? (Yes or No)

77. Solve the system of equations by any convenient method. $\begin{cases} 4x - 14y = -15 \\ 18x - 12y = 9 \end{cases}$

78. Simplify: $\dfrac{\dfrac{5x}{x+7}}{\dfrac{10}{x^2+8x+7}}$

Use the following set of numbers to answer questions 79 thru 82. $\left\{ 2, 0, -3, \dfrac{1}{2}, \dfrac{9}{3}, \sqrt{2}, \sqrt{4}, 3i \right\}$

79. Which of the numbers above are natural?

80. Which of the numbers above are rational?

81. Solve: $|3 - 2x| = 5$

82. Solve: $2(x+3) \le 4$

For 83 thru 85 graph the solution set on a number line.

83. $2 < \dfrac{x+4}{-2} < 4$
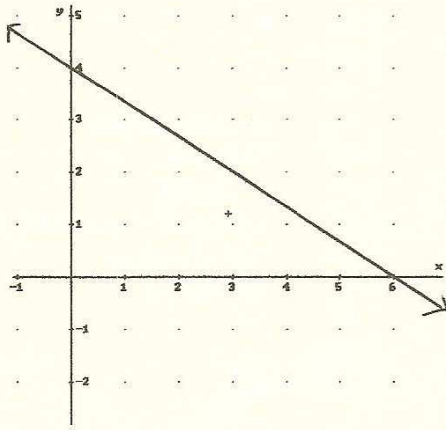
84. $|x+1| \ge 2$

85. $\left| \dfrac{x}{3} + 1 \right| - 4 > -1$

Answers

1.	16	31.	$\dfrac{25}{9}$	61.	2/y
2.	$\dfrac{2}{3}$	32.	$27x^3y^6$	62.	6
		33.	36	63.	–5
3.	$\dfrac{1}{4x^8y^6}$	34.	$4m^4n^3\sqrt{2mn}$	64.	0
4.	3	35.	$-10xy^2\sqrt[3]{2x^2y}$	65.	no real solution
5.	12			66.	12 hours
6.	4th	36.	$6y^2$	67.	6/5 hours
7.	17			68.	All real #'s except 0
8.	$7y^3-2y+5$	37.	$\dfrac{3\sqrt{7}}{7}$	69.	See back page
9.	$-12a^2b^2c^4+3abc^5$			70.	13 cm.
10.	$x^2-8xy+16y^2$	38.	$\dfrac{\sqrt[3]{20}}{2}$	71.	5 in.
11.	$6x^2-x-35$	39.	x+4	72.	–1-7i
12.	$4x^2-6+\dfrac{12}{x+2}$	40.	$-4\sqrt[3]{3}$	73.	1-i
		41.	-36a	74.	½+i
13.	$4a^3b\left(16b+4a-b^2\right)$	42.	$3\sqrt{2}+3$	75.	$P=\dfrac{A}{1+RT}$
14.	$2(y+7)(y-7)$	43.	-25		
15.	$2(2a+3b)(4a^2-6ab+9b^2)$	44.	-2	76.	Yes
16.	$(x+3)(y+2)(y-2)$	45.	4, 3/2	77.	$\left(\dfrac{3}{2},\dfrac{3}{2}\right)$
17.	$(x-6)(x+3)$	46.	$2\pm\sqrt{3}$		
18.	$3(2x+1)(x-4)$	47.	$3\pm i\sqrt{2}$	78.	$\dfrac{x(x+1)}{2}$
19.	0, 1/2	48.	$\dfrac{1\pm\sqrt{13}}{4}$		
20.	-1, 6			79.	$\left\{2,\dfrac{9}{3},\sqrt{4}\right\}$
21.	$\dfrac{-8x}{3y^2}$	49.	8i , -8i		
		50.	6+2i	80.	$\left\{2,0,-3,\dfrac{1}{2},\dfrac{9}{3},\sqrt{4}\right\}$
22.	$\dfrac{12}{y}$	51.	12		
		52.	1	81.	–1, 4
23.	See back page	53.	80 feet	82.	$(-\infty,-1]$
24.	1/2	54.	117 sq. meters	83.	$(-12,-8)$
25.	-7/5	55.	no solution	84.	$(-\infty,-3]\cup[1,\infty)$
26.	Perpendicular	56.	x+1	85.	$(-\infty,-12)\cup(6,\infty)$
27.	$y=-2x+20$	57.	$\dfrac{x+3}{x+2}$		
28.	$y=-2x+8$	58.	2		
29.	$y=4$	59.	$\dfrac{2x}{x-4}$		
30.	See back page	60.	½		

23.

29.

69.