Mr. Flynn

EXAM Review Key

MCR3U
Final Exam Review

1. What is the third term of the sequence: $t_n = n^2 + 3$. — 1. 12
2. Find the next two terms of the sequence: 1, 8, 27, 64, ___, ___. — 2. perfect cubes; 125, 216
3. Calculate the simple interest on borrowing $500 at 12% for 3 years. — 3. $180
4. True or False: The following sequence is geometric: 2, 8, 32, 128, ... — 4. true
5. What is the interest rate per period of an investment at 9%/a, compounded quarterly? — 5. 2.25%
6. Evaluate: $27^{\frac{-2}{3}}$ (No decimals) — 6. 1/9
7. Simplify: $\left(16x^8\right)^{\frac{1}{4}}$ — 7. $2x^2$
8. If $g(x) = 3x^2 - 2x + 1$, find g(-2) — 8. 17
9. Is the following set of ordered pairs a function? $\{(2,7),(3,5),(-2,5),(0,3)\}$ — 9. yes
10. What is the inverse of the function $y = 2x + 1$? — 10. $f^{-1}(x) = \frac{x-1}{2}$
11. Evaluate: $-\sqrt{20}$ — 11. $-2\sqrt{5}$
12. How many x-intercepts does the function $y = -(x - 3)^2 + 4$? — 12. 2
13. Find the value of "d" that makes the following expression a perfect square: $x^2 + \frac{3}{2}x + d$ — 13. 9/16
14. Using the discriminant, determine the number of zeros of the function, $y = 2x^2 + 4x - 3$ — 14. 2 zeros
15. What are the next two positive, coterminal angles of 41°? — 15. 401°, 761°
16. What is the principal angle of -187° ? — 16. 173°
17. What is the range of the cosine function. — 17. $-1 \le y \le 1$
18. State the period of the function $y = 2 \sin 3\theta$ in degrees. — 18. 120°
19. Solve for θ: $\cos\theta = 0$, $0° \le \theta \le 360°$ — 19. 90°, 270°
20. What is the range of the function $y = 3 \sin\theta + 6$ — 20. $3 \le y \le 9$
21. What is the exact value of tan 60° ? — 21. $\sqrt{3}$
22. If a $12000 car depreciates by 20% each year, what is its value after 6.5 years? — 22. $2813.62
23. What is the range of the function $y = 2(3)^x + 5$. — 23. $y > 5$
24. What is the y-intercept of $f(x) = -5(\frac{1}{2})^x + 3$ — 24. −2
25. What is the horizontal asymptote of $y = (1.5)^x + 9$ — 25. $y = 9$
26. What is the domain of $y = 13(\frac{2}{7})^x - 2$ — 26. $x \in \mathbb{R}$
27. Is the above function increasing or decreasing? — 27. decreasing
28. The value of a vase is given by $f(x) = 500(1.028)^x$ where x is the number of years and f(x) is the value.
    What is the value of the vase today (original value)? — 28A. $500
    How much does it appreciate by each year? — 28B. 2.8%
29. Is $f(x) = -5^x$ increasing or decreasing? — 29. decreasing
30. Evaluate: $\left(\frac{1}{36}\right)^{\frac{1}{2}}$ — 30. 1/6

31. Evaluate: $16^{\frac{3}{4}}$ — 31. 8

32. Evaluate: $(32)^{\frac{-3}{5}}$ — 32. 1/8

33. Evaluate: $(3^2 \times 4)^{-1}$ — 33. 1/36

34. Evaluate to **two decimal places**: $9.34^{\frac{-1}{5}}$ — 34. 0.64

35. Simplify: $\left(\frac{\sqrt[4]{y^4}}{\sqrt{y^2}}\right)^3$ — 35. 1

36. Express using only positive exponents: $\frac{9x^{-6}y^3}{6x^{-3}y^{-2}}$ — 36. $3y^5/2x^3$

37. Solve the following exponential equation: $4^x = \sqrt[3]{4}$ — 37. 1/3

38. Solve the following exponential equation: $2^x = 2^{2x} \times 2^3$ — 38. −3

39. Simplify: $\left[(2x^2 - 3x^2)^3 - 4x(2x + 5x^3)^{-4}\right]^0$ — 39. 1

40. Simplify $(-2x^3 + 4x - 7) + (5x^3 - 12)$ — 40. $3x^3 + 4x - 19$

41. Express $\sqrt{90}$ as a mixed radical. — 41. $3\sqrt{10}$

42. Express $5\sqrt{4}$ as an entire radical. — 42. $\sqrt{100}$

43. Simplify: $2\sqrt{6} \times 3\sqrt{6}$ — 43. 36

44. Simplify: $\sqrt{5x} \times \sqrt{4x}$ — 44. $2x\sqrt{5}$

45. True or False: $\sqrt{a} + \sqrt{b} = \sqrt{a+b}$ — 45. False

46. Simplify: $3\sqrt{2} - 8\sqrt{2} + 4\sqrt{2}$ — 46. $-\sqrt{2}$

47. Simplify: $\sqrt{20} + \sqrt{5}$ — 47. $3\sqrt{5}$

48. Simplify: $(3 + 5\sqrt{7})(3 - 5\sqrt{7})$ — 48. −166

49. Simplify: $(\sqrt{*} + \sqrt{*})^2$ — 49. 4*

50. What is the domain of the function $y = \sqrt{2x - 7}$ — 50. $x \geq 7/2$

51. Determine the fifth term of the following sequence: $t_n = \frac{2n^2+5}{n+4}$ — 51. 55/9

52. Find the next term of the following sequence: 41, 44, 39, 46, 37, — 52. 48

53. Write the general term for the sequence 3, 15, 75, 375, ... — 53. $t_n = 3(5)^{n-1}$

54. Write the general term for -32, -11, 10, 31, ... — 54. $t_n = -53 + 21n$

55. Does the general term, $t_n = 3^{n+1}$, represent an arithmetic sequence, geometric sequence or neither? — 55. geometric

56. Does the general term, $t_n = (n+2)(n-3)$, represent an arithmetic sequence, geometric sequence or neither? — 56. neither

57. Prove the following identity: $\sin x + \tan x = \tan x(1 + \cos x)$ — 57.

$\sin x + \frac{\sin x}{\cos x}$

$\frac{\sin x \cos x + \sin x}{\cos x}$

$\frac{\sin x(\cos x + 1)}{\cos x}$

$\tan x(1 + \cos x)$

= R.S.

58. Simplify using only positive exponents: $\frac{6x^{-2}y^3z}{15x^{-4}y^2}$ — 58. $2x^2yz/5$

59. State the restrictions on the following expression: $\frac{2x^2 - 5}{3x^2(x+7)}$ — 59. $x = 0, x = -7$

60. Simplify: $-\dfrac{-(a-b)}{-a+b}$

61. Simplify: $(2x^2 - 7x + 6) - (x^2 - 2x - 9)$

62. Expand and Simplify: $-6x(3x+2) + 4x^2 - 7x + 11$

63. Expand and Simplify: $(x-5)^2$

64. Is $(x-6)^2 = (6-x)^2$

65. Factor: $2ab + 2a - 3b - 3$

66. What is the equation of the vertical asymptote of $y = \dfrac{1}{2x-5}$

67. At what coordinates is the hole for the graph $y = \dfrac{(x-3)}{(x-3)(x+2)}$ $x=3$

68. State the vertex of $f(x) = 3x^2 - 6x + 5$. $\dfrac{1}{x+2}$

69. State the equation of a parabola with zeros -2 and 4 and y intercept of -16.

70. Factor: $16a^2 - 4$ $4(4a^2-1)$

71. Factor: $x(x-3) - 2(x-3)$

72. Factor: $2n - 6m + 5n^2 - 15mn$

73. Factor: $3a^2 - 10a - 8$ $(3a+2)(a-4)$

74. What are the coefficients in the expansion of $(y-1)^6$?

75. What is the recursive formula for 3,5,2,-3,-5,-2,....

60. -1

61. $x^2-5x+15$

62. $-14x^2-19x+11$

63. $x^2-10x+25$

64. yes

65. $(2a-3)(b+1)$

66. $x=5/2$

67. $(3, 1/5)$

68. $=3(x-1)^2+2$ $\therefore (1,2)$

69. $y=2(x+2)(x-4)$

70. $4(2a-1)(2a+1)$

71. $(x-2)(x-3)$

72. $(2+5n)(n-3m)$

73. $(3a+2)(a-4)$

74. 1, 6, 15, 20, 15, 6, 1

75. _____

$t_1=3$, $t_2=5$, $t_n = t_{n-1} - t_{n-2}$, $n>2$

#74.

```
          1
        1   1
      1   2   1
    1   3   3   1
  1   4   6   4   1
1   5  10  10   5   1
1 6  15  20  15   6   1
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#68. $f(x) = 3(x^2-2x+1-1)+5$
$= 3(x^2-2x+1) - 3 + 5$
$= 3(x-1)^2 + 2$

#69. $y = a(x+2)(x-4)$
$-16 = a(0+2)(0-4)$
$-16 = a(2)(-4)$
$-16 = -8a$
$a = 2$
$y = 2(x+2)(x-4)$