Name:_____

Fall Semester Exam Review

A completed review will be worth the curve on the exam. **Questions with *** are calculator questions**

Unit 1 Polynomials

Graph

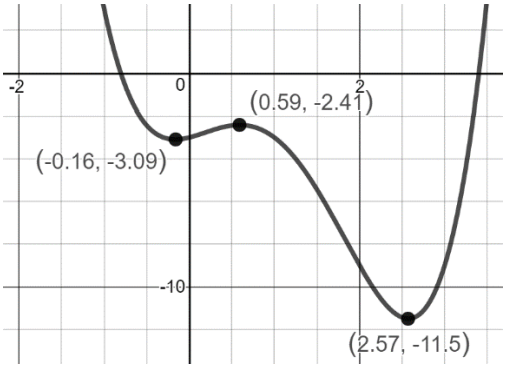
1. $y=-x(x+3)^2$

2. $y=(2x-1)^2(x+5)^2$

3. $y=-x^3(x-3)^2(x+5)$

4. Find the remainder when the polynomial $2x^4+x^3-x+2$ is divided by the binomial $x-2$

5. Find the relative extrema of the function $y=-x(x+3)^2$ and list the intervals where the function is increasing and decreasing



Unit 2 Rational Functions

Find all asymptotes and graph

6. $\dfrac{2x-3}{x-4}$

7. $\dfrac{x^2-1}{x^2+11x-12}$

8. $\dfrac{x+6}{x^2-9}$

9. $\dfrac{x^2-2x-15}{x+3}$

10. $\dfrac{x^2+1}{x-3}$

Find the domain of the function

11. $\dfrac{2}{x^2-4x+3}$

12. $\dfrac{2}{3x^2-7x+6}$

Unit 3 Logs and Exponents

Write as a single log

13. $\log 25+\log 4$

14. $6(\log a+\log b)$

15. $\ln 2x+3(\ln x-\ln y)$

Solve. Leave answers in terms of ln if needed

16. $5^x=\dfrac{1}{25}$

17. $3^x=8$

18. $27^{2x-1}=9^{x+3}$

19. $\log_4(3x-2)=2$

20. $\log_8 x=\dfrac{2}{3}$

21. $5\log_2(\log_3 81)$

22. $5e^x-12=7$

23. $\ln 1$

24. $\ln e^3$ 25. $2 = \log_3(9n+10) - \log_3(5n)$ 26. $\ln 5 + \ln(x+2) = \ln 7$ 27. $\log x + \log(x-9) = 1$

***28. A radioactive substance has a half-life of 420 years. How much remains of a 2 oz. sample after 200 years?

***29. A bacteria culture has an initial count estimate of 4000. After 20 minutes the count is 22, 400. What is the growth rate, and approximately how many minutes did it take for the culture to double?

***30. $3000 is invested in an account that pays 5% annual interest. How much more money would you make if the interest was compounded daily for 10 years instead of compounded quarterly?

***31. How many years will it take an investment of $1000 to double itself when interest is compounded continuously at 6% annually?

****Unit 4 Series and Sequences*

32. Write the first 5 terms of the sequence whose nth term is $a_n = n^2 - 3$

33. If $a_n = a_{n-1} + 5$ and $a_1 = 3$, find a_2, a_3 and a_4

34. Evaluate $\sum_{x=5}^{9} |4 - x|$

35. Evaluate $\sum_{c=0}^{4} (-2)^c$

36-37: Rewrite using sigma notation:

36. -4 – 8 – 12 – 16 – 20

37. 12 + 3 – 6 – 15

Determine whether the sequence is arithmetic, geometric or neither. If arithmetic or geometric, find the nth term.

38. 5, 7, 9, 11, 13…

39. 1/7, 1, 7, 49…

40. 15, 17, 20, 23, 25…

Find the sum of the series

41. $\frac{1}{3}-\frac{2}{3}+\frac{4}{3}-\frac{8}{3}...$

42. $25+5+1+...$

43. Expand the following binomial $(x-2y)^5$

44. Find the 3rd term of the expansion of $(2a+3b)^{12}$

Unit 5 Conics

Tell which conic is represented by the equations

45. $2x+3y^2+17=0$

46. $8x^2+4y^2+3x-2y+17=0$

47. $-3x^2-3y^2+4x-2y+5=0$

48. $6x^2-2y^2+7x+2y-4=0$

Write the equation in standard form and draw a graph.

49. $-4(x-1)^2+9(y-3)^2=36$

50. An ellipse with endpoints (-1,7), (-1, -3) (-4, 2) (2,2)

51. $x^2+y^2+6x+4y+12=0$

Unit 6 Right Triangle Trigonometry

52. Find the exact values of the six trig functions of an angle θ whose terminal side passes through the point (-5, -7).

Find the exact value:

53. $\cos\frac{\pi}{4}\sin\frac{7\pi}{6}-\sin\frac{\pi}{6}\cos\frac{3\pi}{4}$

54. $\cot^2\frac{11\pi}{6}-\csc^2\frac{11\pi}{6}$

55. $\sin\frac{\pi}{2}+6\cos\frac{\pi}{3}$

56. $\dfrac{\cos\frac{5\pi}{3}}{\sin\frac{5\pi}{3}}$

57. $\sin^2\frac{\pi}{6}+\cos^2\frac{\pi}{6}+\tan^2\frac{\pi}{6}-\sec^2\frac{\pi}{6}$

58. Convert 40° to radians

59. Convert $\frac{\pi}{9}$ radians to degrees

60. Find a positive and negative angle coterminal to 84°

61. If $\sin\theta < 0$ and $\cot\theta < 0$, then θ must lie in which quadrant?

***62. Your cat is trapped on a tree branch 6.5 meters above the ground. Your ladder is only 6.7 meters long. If you place the ladder's tip on the branch, what angle will the ladder make with the ground?

***63. Commercial airliners fly at an altitude of about 10 kilometers. They start descending toward the airport when they are far away, so that they will not have to dive at a steep angle.

a. If the pilot wants the plane's path to make an angle of 3° with the ground, at what horizontal distance from the airport must he start descending?

b. If he starts descending a ground distance of 300 km from the airport, what angle will the plane's path make with the horizontal?

***64. While standing on a cliff 120 feet high, I see a sailboat at an angle of depression of 21°. What is the horizontal distance between the cliff and the sailboat?