Semester 2 Final Review. Day 1 Chapter 9.

1. Pg. 699(# 17-19 a&c only, 25- 27a&c only, 31-34)

2. MC: 1. Find the eccentricity of the ellipse.

$\frac{x^2}{36}+\frac{y^2}{4}=1$

[A] $\frac{\sqrt{35}}{7}$

[B] $\frac{2\sqrt{5}}{9}$

[C] $\frac{4\sqrt{19}}{5}$

[D] $\frac{2\sqrt{2}}{3}$

2. Find the vertices, foci, and the equations of the asymptotes of the hyperbola.

$100x^2-16y^2-25=0$

[A]

Vertices: $\left(\pm\frac{1}{2},\ 0\right)$; Foci: $\left(\pm\frac{1}{4}\sqrt{29},\ 0\right)$; Asymptotes: $y=\pm\frac{2}{5}x$

[B]

Vertices: $\left(0,\ \pm\frac{5}{4}\right)$; Foci: $\left(0,\ \pm\frac{1}{4}\sqrt{29}\right)$; Asymptotes: $y=\pm\frac{2}{5}x$

[C]

Vertices: $\left(0,\ \pm\frac{5}{4}\right)$; Foci: $\left(0,\ \pm\frac{1}{4}\sqrt{29}\right)$; Asymptotes: $y=\pm\frac{5}{2}x$

[D]

Vertices: $\left(\pm\frac{1}{2},\ 0\right)$; Foci: $\left(\pm\frac{1}{4}\sqrt{29},\ 0\right)$; Asymptotes: $y=\pm\frac{5}{2}x$

3. Find the standard form of the equation of the specified hyperbola.

Vertices: $(\pm 3,\ 0)$; Foci: $(\pm 8,\ 0)$

[A] $\frac{x^2}{55}+\frac{y^2}{9}=1$

[B] $\frac{x^2}{9}+\frac{y^2}{55}=1$

[C] $\frac{x^2}{55}-\frac{y^2}{9}=1$

[D] $\frac{x^2}{9}-\frac{y^2}{55}=1$

4. Identify the equation of an ellipse.

[A] $-5y^2+2y+8x^2+5x-2=0$

[B] $5x^2+2x+5y^2-2y-3=0$

[C] $-2x^2+2x-4y^2-3y=11$

[D] $-2y^2+2x-3y=6$

5. Find the standard form of the equation of the specified hyperbola.

Center: $(-4,\ -3)$

Focus: $(9,\ -3)$

Vertex: $(-9,\ -3)$

[A] $\frac{(y+3)^2}{25}-\frac{(x+4)^2}{144}=1$

[B] $\frac{(x+4)^2}{25}+\frac{(y+3)^2}{144}=1$

[C] $\frac{(x+4)^2}{25}-\frac{(y+3)^2}{144}=1$

[D] $\frac{(x-4)^2}{25}-\frac{(y-3)^2}{144}=1$

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6. Solve the system of equations algebraically by using the substitution method.

$$\begin{cases} 2x^2 + y^2 - 33 = 0 \\ 3x + y - 11 = 0 \end{cases}$$

[A] $(2,\ 7),\ (3,\ -2)$

[B] $(2,\ -1),\ (3,\ -2)$

[C] $(2,\ -1),\ (4,\ 5)$

[D] $(2,\ 5),\ (4,\ -1)$

7. Find the center and radius of the circle.

$x^2 + y^2 = 36$

[A] Center: $(6,\ 0)$
Radius $= 6$

[B] Center: $(0,\ 36)$
Radius $= 6$

[C] Center: $(0,\ 0)$
Radius $= 6$

[D] Center: $(0,\ 0)$
Radius $= 36$

8. Find the equations of the asymptotes of the hyperbola.

$-4x^2 + y^2 - 16x - 6y - 23 = 0$

[A] Asymptotes: $y = \pm\frac{1}{2}x$

[B] Asymptotes: $y = \frac{1}{2}x + 4,\ y = -\frac{1}{2}x + 2$

[C] Asymptotes: $y = \pm 2x$

[D] Asymptotes: $y = 2x + 7,\ y = -2x - 1$

3. Essay questions:

Find the standard form of the equation, center or vertex and graph.

1. $-2y^2 + 2x - 3y = 6$
2. $100x^2 - 16y^2 - 25 = 0$
3. $16x^2 - 9y^2 - 72y - 288 = 0$
4. $x^2 + y^2 = 36$
5. $-4x^2 + y^2 - 16x - 6y - 23 = 0$
6. $9x^2 + 4y^2 - 54x + 40y + 37 = 0$
7. $4x^2 + y^2 - 32x - 4y + 52 = 0$
8. $(x-4)^2 = 2(y-1)$
9. Solve the system algebraically.
$$2x^2 + y^2 - 33 = 0$$
$$3x + y - 11 = 0$$
10. Identify the following a circle, parabola, ellipse, hyperbola or rectangular hyperbola. Do not graph.
   a. $x^2 + 4y^2 = 36$
   b. $2x^2 + 2x - 3y^2 = 6$
   c. $2x^2 + 2x + 2y^2 = 6$
   d. $2x^2 + 2x - 3y = 6$
   e. $-2y^2 + 2x - 3y = 6$
   f. $2x^2 + 2x + 3y^2 - 9y = 6$
   g. $-2y^2 + 2x^2 - 4y = 6$

Day 2 (Due Monday)

Math Analysis Review Chapter 1 page 1

1. Find the solution to the equation.
$(x-4)+2=5(x-5)+2$

2. Solve the inequality. $|1-6x|-6<3$

3. Find the solution to the equation. $2=4(x-4)+2-3x$

4. A model for the demand for saws is $d=-3p^2+246p-80$ where d is the number of saws a manufacturer can sell at a price of p dollars each. Use a graphing utility to graph the equation. Then find the price that results in the maximum demand for saws.

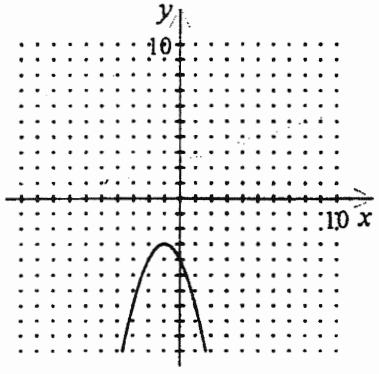
5. Solve the inequality. $\frac{x}{7}-8<-3$

6. Solve. $-\frac{8}{x}+\frac{4}{x-8}=-3$

7. Find the x- and y-intercepts of the graph of the equation.
$-3x+4y=6$

8. Find the distance between the points. $(1, 5)$, $(-2, -4)$

10. Determine the intervals on which the function is increasing, decreasing, or constant.



11. Determine the quadrant in which (x, y) is located so that the conditions are satisfied. $x<0$ and $y=-6$

12. Find the domain of the function. $f(x)=\sqrt{-3x-1}$

13. Find the solution to the equation.
$-0.7(0.06+5x)=-3.4x$

14. Find the standard form of the equation of the specified circle.
Center: $(3, 3)$; Radius: 6

15. Solve the inequality. $\frac{13}{12}-\frac{1}{3}x+\frac{11}{12}\le 7x-\frac{4}{3}$

16. Find the general form of the equation of the line that passes through the given points. Use the equation to find two other points on the line. $(-4.9, 1.2)$, $(9.1, 5.2)$

17. Find $(f+g)(x)$ for $f(x)=\frac{1}{x^2}$ and $g(x)=x$.

18. Find the equation in slope-intercept form and identify the slope and the y-intercept. $6x=4y+3$

19. An arrow shot into the air is modeled by the equation $y=128t-16t^2$ where y is the number of feet the arrow is above ground t seconds after it is released. Graph the equation to find what period of time the arrow is above 112 feet.

20. Is $y=-x^2+2$ even, odd or neither

21. Find the domain and range of the function. $f(x)=-3x^2-8$

22. Solve the inequality. $-9\le -3x+15\le 15$

23. Solve the inequality and graph the solution on a number line.
$x^2-x-72<0$

24. Solve
$|4x-6|>6$

25. Determine the point(s) of intersection algebraically.

$$y=-3(x-1)^2-1$$
$$y=-9x+14$$

26. Find the domain of the function. $f(x)=\frac{x^2-x-72}{x^2+x-12}$

27. Solve. $\sqrt[3]{x-7}=3$

28. Find the slope-intercept form of the equation of the line through the point $(-9, 5)$, perpendicular to the graph of $y=-\frac{1}{5}x-1\frac{1}{2}$.

29. Solve. $\left|\frac{4}{5}x+4\right|+4=11$

30. Graph

$$f(x)=\begin{cases}-x^2, & x\le 2\\ \sqrt{x-1}-5, & x>2\end{cases}$$

31. The diameter of a circle joins the points $C(4, -9)$ and $D(5, 1)$. Find the coordinates of the center of the circle.

32. Suppose $f(x)=x^2$ and $h(x)=x^2+2$. Find $(h/f)(x)$

33. If $f(x)=|2x|$ and $g(x)=-2x$, find $(f\circ g)(x)$.

34. Find the general form of the equation of the line that passes through the given point and has the indicated slope.
$(0, 2)$, $m=\frac{4}{7}$

35. Solve. $x^3+5x^2-16x-80=0$

36. Determine whether the graphs of the equations are parallel, perpendicular, or neither. $-5x-5y=0$ and $5x-5y=-3$

37. Find the inverse of the function. $f(x)=\frac{2+x}{-4-3x}$

38. Solve. $x^4-5x^2+3=-1$

39. Evaluate the function at the specified value(s) of the independent variable and simplify. $f(x)=2x^2-\sqrt{9x}$; $f(6)$

Day 3 (also due Monday)

Math Analysis Review Chapters 2 Page 1

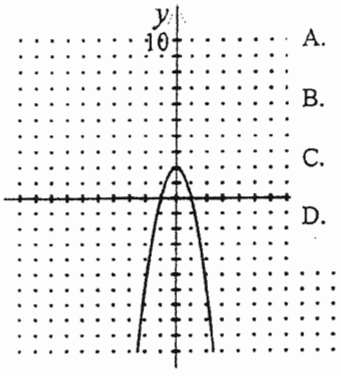
1. Find the equation of the quadratic function in standard form and find the vertex of the graph.

$f(x) = -16x - 5 + 2x^2$

2. Identify the right-hand and left-hand behavior of the graph of the polynomial function. (It means end behavior.)

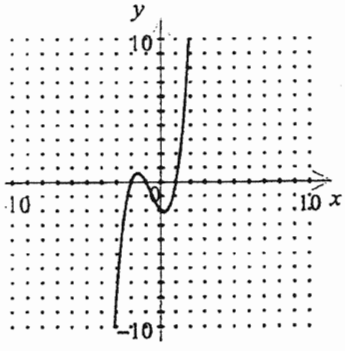
$f(x) = -6x^6 + 3x^2$

3. Determine which statement is true about the graph of the function.



A. The degree of the function is odd. The leading coefficient is negative.
B. The degree of the function is even. The leading coefficient is negative.
C. The degree of the function is odd The leading coefficient is positive.
D. The degree of the function is even The leading coefficient is positive.

4. Identify the polynomial function that has zeros at −1, −2, and 1 and matches the graph below.



A. $f(x) = x^3 + 2x^2 - x - 2$
B. $f(x) = x^2 - x + 2$
C. $f(x) = x^2 + 2x - 1$
D. $f(x) = -x^3 - 2x^2 + x - 2$

5. Find all real zeros of the polynomial function.

$f(x) = -8x^4 + 200x^2$

6. Use long division to divide. $\dfrac{g^3 + 216}{g + 6}$

7. Use long division to divide.

$(14x^2 - 6x^3 - 19 + 2x) \div (2x - 4)$

8. List the possible rational zeros of f, then use a graphing utility to determine which of those are actual zeros of f.

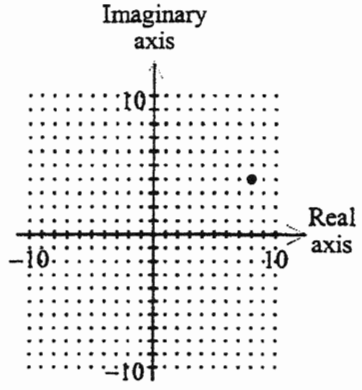
$f(x) = x^3 - 10x^2 + 29x - 20$

9. Express $\sqrt{-66}$ in the form bi where b is a real number.

10. Divide and write the result in standard form. $\dfrac{3 + 2i}{5 + 2i}$

11. Divide and write the result in standard form. $\dfrac{4 + 7i}{7 - 5i}$

12. Find the complex number in standard form.



13. Find the real zeros of the function.

$f(x) = x^3 + x^2 + x + 1$

14. Find all the zeros of the function.

$f(x) = 4x^2 + 5x + 3$

15. Find a third-degree polynomial function with real coefficients and with zeros at -4 and $-3 + i$. First find the other zero.

16. Given that one zero of $P(x) = x^3 + 4x^2 + 9x + 10$ is $-1 + 2i$, which of the following is also a zero of $P(x)$?

17. Find all the zeros of the function.

$f(x) = x^4 - 2x^3 - 2x^2 + 8x - 8$

18. Determine the domain of the function.

$f(x) = \dfrac{7x}{x(x^2 - 36)}$

19. Find the horizontal asymptotes, if any, of the graph of $f(x) = \dfrac{x^4 + 3}{5x^5 + 4x + 8}$.

20. Graph of the rational function. Find any vertical and horizontal asymptotes.

$f(x) = \dfrac{x - 5}{x - 6}$

Day 4 (due Tuesday)

Math Analysis Review Chapters 3

1. Evaluate the expression. $1500\left(2^{-1.5}\right)$

2. Graph of the function. $f(x)=5^x$

3. Evaluate the expression. $4+e^{-1.1}$

4. Evaluate the expression. e^{-4}

5. Graph of the function. $f(x)=2+e^x$

6. The population of an endangered animal species is $f(x)=460(0.87)^t$ where 460 is the number of animals currently in the population and t is the time in years. The population is decreasing at an annual rate of 13%. Which is the estimated number of animals in this population in 5 years?

7. Evaluate the expression without using a calculator. $\log_5 25$

8. Write the following in exponential form. $\log_{27} 81=\frac{4}{3}$

9. Graph the logarithmic function. $f(x)=\log_2 x+3$

10. Evaluate the expression without using a calculator. $\ln\sqrt[3]{e}$

11. The number of units sold for a certain product is $N=3300\ln(5t+6)$ where t is the number of years after the product is introduced. What are the expected sales 5 years after the product is introduced?

12. Expand the following logarithmic expression. $\log_b\sqrt{\frac{27}{77}}$

13. Use the properties of logarithms to expand the expression. (Assume all variables are positive.) $\log_b\sqrt[3]{\frac{x^2y^7}{z^9}}$

14. Solve for x. $\ln x-\ln 1=0$

15. Solve for x. $\left(\frac{1}{4}\right)^x=64$

16. Solve the exponential equation algebraically. $6^x=5^{x+3}$

17. Solve the exponential equation algebraically. $4e^{-0.06x}+47=75$

18. An automobile manufacturer is introducing a new fuel-efficient model and estimates the demand for the car as $N=62{,}000\ln(7t+3)$ where N is the estimated number of cars to be sold and t is the number of years after the car is introduced. When will the demand be 230,000 cars?

19. The number of bacteria N in a culture is modeled by $N=200e^{kt}$ where t is the time in hours. If $N=300$ when $t=3$, what is the time required for the original population to double in size?

20. A virus is accidentally brought to a remote village with a population of 2500 that has never been exposed to the disease. The spread of the virus is modeled by $y=\frac{2500}{1+2499e^{-0.4t}}$ where t is the time in days since the virus was introduced. How many villagers will be infected after 20 days?

21. A rumor begins at a closed-campus high school that the King of Baklava is visiting the school that afternoon. There are 2600 students in the high school and the spread of the rumor is modeled by $y=\frac{2600}{1+2599e^{-0.4t}}$ where y is the number of students who have heard the rumor and t is the time in minutes. How long before 90% of the students have heard the rumor?

Day 5 (due Wednesday)

Math Analysis Chapter 7 Review

1. Jan and Chris drove a total of 846 miles in 15.2 hours. Jan drove the first part of the trip and averaged 45 miles per hour. Chris drove the remainder of the trip and averaged 65 miles per hour. For what length of the time did Jan drive?

2. Solve the system by the method of substitution.

$$\begin{cases} 2x+3y=-19 \\ 7x-4y=35 \end{cases}$$

3. Solve the system by elimination.

$$\begin{cases} 2x-9y=54 \\ 3x+9y=-9 \end{cases}$$

4. Use back-substitution to solve the system of linear equations.

$$\begin{cases} 4x+3y+8.5z=3.5 \\ -2.5y+3z=-3.5 \\ z=1.5 \end{cases}$$

5. Graph the system. Use the graph to determine if the system is consistent or inconsistent. If the system is consistent, determine the number of solutions.

$$\begin{cases} x+y=1 \\ y=2x+7 \end{cases}$$

6. Solve the system by elimination.

$$\begin{cases} 6x-8y=-30 \\ 3x+8y=-51 \end{cases}$$

7. Solve the system by the method of substitution.

$$\begin{cases} x-2y=10 \\ -3x+y=-5 \end{cases}$$

8. Use back-substitution to solve the system of linear equations.

$$\begin{cases} 6x+y+3z=-3 \\ -2y-10z=9 \\ z=-1 \end{cases}$$

9. Solve the system graphically.

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

10. The length of a rectangle is 6 cm less than three times its width. If the area is $24\ \text{cm}^2$, find the dimensions of the rectangle.

11. Use Cramer's Rule to solve (if possible) the system of equations.

$$\begin{cases} 4x+5y=9 \\ 5x+2y=-4 \end{cases}$$

12. Evaluate the expression $4A+5B$

$$A=\begin{bmatrix} 1 & -6 & 0 \\ 5 & -8 & 7 \\ -1 & -4 & -9 \end{bmatrix}, \quad B=\begin{bmatrix} 3 & -6 & 7 \\ -2 & 2 & -1 \\ -3 & 4 & -4 \end{bmatrix}$$

13. Determine the order of the matrix.

$$\begin{bmatrix} -7 & 0.71 & 7 \\ \sqrt{2} & -7 & 0 \\ 3 & -5 & 2.5 \end{bmatrix}$$

14. Find the product, if possible.

$$AB, \text{ if } A=\begin{bmatrix} 0 & 1 & 1 \\ 1 & -1 & 0 \end{bmatrix}, \quad B=\begin{bmatrix} 1 & -3 \\ 0 & 1 \\ 4 & -1 \end{bmatrix}$$

15. Find the product, if possible.

$$BA, \text{ if } A=\begin{bmatrix} -3 & -4 & 3 \\ -5 & -2 & 4 \\ 1 & -5 & 1 \end{bmatrix}, \quad B=\begin{bmatrix} 2 & -1 & 2 \\ -2 & -5 & -4 \\ 3 & -4 & -1 \end{bmatrix}$$

16. Find the determinant of the matrix.

$$\begin{bmatrix} 7 & 2 \\ -3 & 1 \end{bmatrix}$$

17. Find t, x, y, and z.

$$\begin{bmatrix} 2 & 3 & 9 & 4t+3 \\ 2x-8 & -7 & -8 & 6 \\ 5 & 5y-1 & 4 & 3z+7 \end{bmatrix}=\begin{bmatrix} 2 & 3 & 9 & 3t \\ x+6 & -7 & -8 & \\ 5 & 4y+9 & 4 & 2z \end{bmatrix}$$

20. Evaluate the expression.

$A-B$

$$A=\begin{bmatrix} \frac{4}{5} & \frac{23}{7} \\ -\frac{3}{8} & \frac{13}{9} \end{bmatrix}, \quad B=\begin{bmatrix} -\frac{56}{3} & -\frac{1}{3} \\ \frac{11}{3} & -\frac{9}{5} \end{bmatrix}$$

21. If $f(x)=2-7x$ and $g(x)=x^2+2$, find (a) $(f\circ g)(x)$ and (b) $(g\circ f)(x)$.

Day 6 (Due Thursday)

Math Analysis Chapter 8 Review

1. A grocery clerk sets up a display of 12-pack cartons of cola. There are 28 cartons at the base of the triangle and one at the top.

How many cartons of cola are needed for the complete display?

2. In 1988, the average cost of a ticket on a privately-owned airline was $132. This amount has increased by approximately $65 yearly. How much should you expect to pay for a ticket on this airline in the year 2005?

3. The average price of a loaf of bread n years after 1950 is approximated by the sequence

$$a_n = 0.04n + 0.14.$$

Use the sequence to predict the price of a loaf of bread in 2008.

4. Find the sum of the infinite series.

$$1.2 + 0.12 + 0.012 + \ldots$$

5. Teesha is in the bowling club. There are 24 students in the club. Two of them will be picked at random to attend an awards banquet. What is the probability that Teesha will *not* be randomly chosen to attend the banquet?

6. Write the first five terms of the sequence. Assume that n begins with 1.

$$a_n = \frac{n^2}{(2n+1)!}$$

7. Find the sum of the finite geometric series to three decimal places.

$$\sum_{n=4}^{7} -5(0.5)^n$$

8. A woman made $25,000 during the first year of her new job at city hall. Each year she received a 10% raise. Find her total earnings during the first six years on the job.

9. Simplify the ratio of factorials $\frac{10!}{8!}$

10. You work at a T-shirt printing business. Of 2500 T-shirts shipped, 75 are printed improperly. If you randomly choose a T-shirt out of the shipment, what is the chance that it is printed correctly?

11. Find the sum of the finite geometric series.

$$\sum_{n=1}^{4} \left(\frac{1}{3}\right)^n$$

12. Suppose you mix up the cards below and choose one without looking. What is the probability of selecting M or U?

S	F	M	X	U	C	Q

13. A custom car dealership offers a variety of options for the interior of a certain car. You can choose from leather, cloth, or vinyl interior in one of 4 different colors. How many choices are there for interior type and color?

14. In how many different ways can four red cards be drawn from a standard deck of cards? (Note: Order of selection is important.)

15. A certain sum of money is invested in a business. Each year this investment earns 1.5 times as much as in the preceding year. If the investment earned a total of $16,250 in four years, how much did it earn in the fourth year?

16. Ten balls numbered from 1 to 10 are placed in an urn. One ball is selected at random. Find the probability that it is *not* the number 6 ball.

17. Suppose you are choosing a wall color from among 3 different paint colors and an accent color from among 5 different paint colors. How many different wall color and accent color combinations are possible?