**MATH 3200** – **Midterm Exam Review (Ch 1- 4)**

**MULTIPLE CHOICE**

1. What is the mapping rule for ?

A)  B) 

C)  D) 

2. The graph of  has been reflected across the x-axis and stretched vertically by a

factor of 2 and translated 5 units left. Which of the equations would describe the new graph?

A)  B)  C)  D) 

3. Which equation best describes the transformations that have been applied to as

shown in the graph?



A) 

B) 

C) 

D) 

4. Given the point (0,0) is on a graph. For which of the following transformations would it

remain an invariant point?

A) reflection in the x-axis, vertical translation

B) reflection in the y-axis, horizontal translation

C) any combination of translations and stretches

D) any combination of reflections and stretches

5. If a function has a point with coordinates , what are the coordinates of a point on the graph of ?

A)  B)  C)  D) 

6. If a function, , has a point with coordinates , what would the coordinates of

A point on the graph of be?

A)  B)  C)  D) 

7. Given  has been transformed by a reflection in the y-axis, a horizontal stretch of , a

horizontal translation of 1 unit right and a vertical translation of 2 units down, what is the new

equation for the image graph?

A)  B) 

C)  D) 

8. Which of the following represents the graph of **?**



A) B)



C) D)

9. Given that has been stretched vertically by a factor of **,** reflected across the

y-axis, moved up 3 units, and moved left 4 units, which of the following equations represents

the transformed image?

A) **** B) ****

C) **** D) ****

10. Given **,** which of the following graphs represents a transformation ****

for ****?





B)

A)



C)

D)



11. What are the domain and range for ?

A) **** B) ****

C) **** D) ****

12. The graph of  is shown in the graph. Which of the following equations could



represent the equation for ?

A) 

B) 

C) 

D) 

13. The domain of  is undefined, which of the following best describes the

value of  ?

A)  B)  C)  D) 

14. What is the domain of ?

A) B)  C)  D) 

15. The graph of  is given. What points would be invariant points when considering the graphs of  and ?



A) 

B) 

C) 



D) no invariant points

16. The graph of is given.

Which of the following would represent the graph of ?

A) B) C) D)









17. Given the graph of  shown , which of the following graphs would best represent

the graph of ?



A) B) C) D)  is not



defined





18. If , which best describes the domain and range of ?

A) **** B) ****

C)  **** D)  ****

19. Use the graph provided to solve the equation, .



A) 

B) 

C) 

D) no solution

20. Which of the following is a polynomial with degree 4,having no quadratic term and

a graph which extends into the third and fourth quadrants?

A)  B) 

C)  D) 

21. Which of the functions is not a polynomial function?

A)  B) 

C)  D) 

22. Which of the following is the graph of an odd degree polynomial with a positive leading coefficient and a root of multiplicity 2?



A) B) C) D)



23. Which of the following equations represents the graph shown?

A) 

B) 

C) 

D) 

24. What is the remainder when  is divided by ?

A)  B)  C)  D) 

25. Given that is a factor of , what are the remaining factors?

A)  B) 

C)  D) 

26. What is the value of  if  is a factor of ?

A)  B)  C)  D) 

27. Which of the following represents the graph of a polynomial with a root of odd multiplicity?



A) B) C) D)

28. What is the quotient when  is divided by ?

A)  B)  C)  D) 

29. Given has zeros of -1 and 5, and  only for , which of the following

graphs best represents ?



A) B) C) D)

30. Using the Integral Roots Theorem, what is the list of possible integral zeros for ?

A)  B) 

C)  D) 

31. Which of the following statements is true?

A) A polynomial of degree 4 must have 4 real roots.

B) A polynomial whose graph lies below the x-axis only for  must

have only 2 real roots and therefore must be a quadratic.

C) A cubic polynomial will have 3 different real roots.

D) An odd degree polynomial must have at least one real root.

32. Convert to radian measure: 

A)  B)  C)  D) 

33. Convert to degree measure: 2 radians

A) 360o B) 114.59o C) 565.49o D) 

34. Which angle is **coterminal** to ?

A)  B)  C)  D) 

35. Which of the following represents the **reference** **angle** for ?

A)  B)  C)  D) 283°

36. In the unit circle, in which quadrant is  positive and negative?

A) I B) II C) III D) IV

37. Find the **exact** coordinates of the point of intersection, , of the terminal arm

of an angle which is in standard position in the unit circle, .

A)  B)  C)  D) 

38. Which of the following graphs represents the angle of  drawn in

standard position?



A) B) C) D)

39. Which of the following expressions will generate all angles which are coterminal

with an angle of ?

A)  B) 

C)  D) 

40. What is the exact value of  ?

A)  B)  C) 1 D) 

41. Solve  ?

A)  B) 

C)  D) 

42. What is the arc length of a195 angle in a circle with a diameter of 8 cm?

A) cm B)  cm C)  cm D) 780 cm

43. If , then find x. ()

A) 30°, 330° B) 30°, 150° C) 210°, 330° D) 150°, 210°

44. Solve for ALL values of x: 

A)  B) 

C)  D) 

45. Solve for x, where .

A)  B) 

C)  D) 

46. Solve  for x, where 

A) 0° B) 90° C) 180° D) 360°

47. Solve , for 

A) -14.7° B) 14.7° C) 194.7°, 345.3° D) 14.7°, 165.3°

48. Determine the equation of the circle whose centre is at  with a radius

of .

A)  B)  C)  D) 

49. Given that is a point on the unit circle, what are the possible value(s)

for ?

A)  B)  C)  D) 

50. Given , list the angles for -180˚ < *x* < 270˚.

A)  B) -75˚,

C)  D) 

**Part II**

1. Given the graph shown,

A) sketch the graph of i)  ii)  B) state any invariant points



2. Determine the equation for the image of .



3. Algebraically determine the equation for  if  with an appropriate

restriction on the domain. (State the restriction on the domain used.)

4. Sketch the graphs of each of the following functions on the grids provided.

State the domain and the range for each radical function and any invariant points

A)  B) 





Domain:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Domain:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Range:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Range:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Invariant points:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Invariant points:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

C)  D) 



Domain:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Domain:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Range:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Range:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Invariant points:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ Invariant points:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

5. Algebraically determine the domain of

A)  B) 

6. A) Algebraically solve . State the restrictions on for the equation.

B) Algebraically solve . State the restrictions on for the equation

7. A polynomial equation,, has a quotient of and a remainder of -1 when divided by . What is the equation to represent ?

8. Determine the equation of the polynomial function (**in factored form**) based on the graph given below.



9. Algebraically determine the intercepts of  and sketch its graph,

labeling all intercepts.

10. Given that  is a factor of , algebraically determine the

roots of .

11. A tank with a volume of 12 ft3 has dimensions, . If  represents the

height of the tank, and you need a tank which is at least 3ft high, write a polynomial equation

to model this situation and then algebraically solve it to determine the dimensions of

this tank. Use your answer to determine whether this tank will be suitable for your needs.

12. A block of ice is used to make a sculpture. The block has dimensions 3ft by 4ft by 5ft and the size of the block is reduced to 24ft3 by shaving the same amount of ice off the length, width and height of the block. Write a polynomial equation to model this situation and then solve it algebraically to determine how much ice was shaved off each dimension.

13. Simplify. Express your answers in exact radical form.

a)  b)  c) 

14. Solve each of the following trigonometric equations for .

(a) 2 cos2 + sin + 1 = 0 (b) 2 cos2 = cos (c) cos2 - cos = sin2

(d) sin2 - 5 sin - 6 = 0 (e) 2 cos2 + cos - 1 = 0 (f) cot = 2 cos

(g) costan = cos (h) 

15. Given each of the following points lie at the intersection of a circle and the

terminal arm of an angle in standard position,

i) sketch the diagram

ii) determine the values of the six trigonometric ratios

iii) determine the angle of rotation from standard position

a)  b) 

16. a) Given , determine the value of .

b) Given , determine the value of 

**Answers:**

1. D 2. C 3. A 4. D 5. B 6. C 7. B

8. C 9. C 10. B 11. C 12. A 13. A 14. B

15. C 16. A 17. A 18. B 19. B 20. B 21. B

22. A 23. B 24. C 25. B 26. B 27. C 28. A

29. C 30. C 31. D 32. C 33. B 34. C 35. B

36. C 37. D 38. B 39. C 40. D 41. D 42. A

43. \* 44. B 45. A 46. C 47. C 48. B 49. D

50. B 51. A

**Part II**

1. A) i) Using key points (-8,-5), (-4,5) , (5,0), & (9,9) on original graph yields new graph with

key points (11,-16), (3,14), (-15,1) and (-23, 26).

ii) new graph has key points (-5,-8), (5,-4) (0,5) (9,9)

B) i) no invariant points ii) (2,2) and (9,9)

2.  \*error (x-1)

3.  has  (domain of  is , range: )

while  has (domain of  is , range: )



.



4. A) B)

Domain:  Domain: 

Range:  Range: 

Invariant points:  Invariant points: 



C) D)

Domain:  Domain: 

Range:  Range: 

Invariant points:  Invariant points: none

5. A)  B) 

6. A) x= 4, restrictions :  B) x = 2 (no restrictions on x since is always positive)

7.  8. 



9. x-intercepts: x= -0.5, 3, 4, y-intercept = -12

10. 

11. need to solve  which gives  as the only possible solution  tank is not

suitable since it is less than 3ft high.

12. need to solve  which gives the only real solution.

13. a) b)  c) 

14. a)  b)  c)  d)  e)  f) 

g)  h) 0.82, 2.89, 5.01



15. a) 



b)



16. a)  b)  c) 

17. 27. a) -7.75 b)  c) y = 4 d)  e) 720º