Name:

MTH133

Unit 4 – Individual Project

**Name:**

1) State the domain of the following:

a) 

Answer:

b) 

Answer:

c) 

Answer:

d) 

Answer:

e) 

Answer:

2) Suppose the graph of is shifted to obtain each the following graphs. What is the equation of the function, *g*(*x*), for each graph?

a)



Answer:

b)



Answer:

3) Consider the following graph of *y* = *f*(*x*).



P: (2,4)

a) If *h*(*x*) *= f*(*x*) *+ 3*, what would the new coordinates of *P* be after the shift? Give answer in (*x*, *y*) form.

Answer:

b) If , what would the new coordinates of *P* be after the reflection? Give answer in (*x*, *y*) form.

Answer:

4) Consider the function .

a) Find *h*, the *x*-coordinate of the vertex of this parabola.

Answer:

Show your work here:

b) Substitute the two integers immediately to the left of *h* and the two integers immediately to the right of *h* into the function to find the corresponding *y*. Fill in the following table. Make sure your *x*-values are in increasing order in your table.

Answer:

|  |  |
| --- | --- |
| ***x*** | ***y*** |
|  |  |
|  |  |
| ***h* =\_\_** |  |
|  |  |
|  |  |

c) Use MS Excel or another web-based graphing utility to graph the function by plotting the points found in the table in part b. Paste your graph here.

Answer:

5) Find the equations for the horizontal and vertical asymptotes of the following. Type *none* if the function does not have an asymptote.

a) 

Answer:

Horizontal:

Vertical:

b) 

Answer:

Horizontal:

Vertical:

c)



Answer:

Horizontal:

Vertical:

d)



Answer:

Horizontal:

Vertical:

6) Find the domain of the following:

a) 

Answer:

Explain how you obtained your answer here:

b) 

Answer:

Show your work or explain how you obtained your answer here:

c) 

Answer:

Explain how you obtained your answer here:

d) 

Answer:

Show your work or explain how you obtained your answer here:

7) Describe the transformations on the following graph of. State the placement of the horizontal asymptote and *y*-intercept after the transformation. For example, *left 1* or *rotated about the y-axis* are descriptions.



a) 

Description of transformation:

Equation(s) for the Horizontal asymptote(s):

*y*-intercept in (*x, y*) form:

b) 

Description of transformation:

Equation(s) for the Horizontal asymptote(s):

*y-*intercept in (*x, y*) form:

8) Describe the transformations on the following graph of. State the placement of the vertical asymptote and *x*-intercept after the transformation. For example, *left 1* or *stretched vertically by a factor of 2* are descriptions.



a) 

Description of transformation:

Equation(s) for the Vertical asymptote(s):

*x*-intercept in (*x, y*) form:

b) 

Description of transformation:

Equation(s) for the Vertical asymptote(s):

*x*-intercept in (*x, y*) form:

9) The formula for calculating the amount of money returned for an initial deposit into a bank account or CD (certificate of deposit) is given by  
  
*A* is the amount of the return.  
*P* is the principal amount initially deposited.  
*r* is the annual interest rate (expressed as a decimal).  
*n* is the number of compound periods in one year.  
*t* is the number of years.

Carry all calculations to six decimals on each intermediate step, then round the final answer to the nearest cent.  
  
Suppose you deposit $3,000 for 9 years at a rate of 6%.

a) Calculate the return (*A*) if the bank compounds annually (*n* = 1). Round your answer to the hundredth's place.

Answer:

Show work in this space. Use ^ to indicate the power or use the Equation Editor in MS Word.

b) Calculate the return (*A*) if the bank compounds quarterly (*n* = 4). Round your answer to the hundredth's place.

Answer:

Show work in this space:

c) Does compounding annually or quarterly yield more interest? Explain why.

Answer:

Explain:

d) If a bank compounds continuously, then the formula used is   
where *e* is a constant and equals approximately 2.7183.  
Calculate *A* with continuous compounding. Round your answer to the hundredth's place.

Answer:

Show work in this space:

e) A commonly asked question is, “How long will it take to double my money?” At 6% interest rate and continuous compounding, what is the answer? Round your answer to the hundredth's place.

Answer:

Show work in this space:

10) Suppose that the function  represents the percentage of inbound e-mail in the U.S. that is considered spam, where *x* is the number of years after 2002.

Carry all calculations to six decimals on each intermediate step when necessary.

a) Use this model to approximate the percentage of spam in the year 2006 to the nearest tenth of a percent.

Answer:

Show your work in this space:

b) Use this model to determine in how many years it will take for the percent of spam to reach 85% provided that law enforcement regarding spammers does not change.

Answer:

Show your work in this space: