Pre-Calculus 12B Exam Review

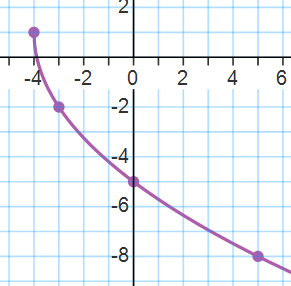
**SHORT RESPONSE:**

1. How many six-character alphanumeric codes can be made without any repeats?
2. How many odd three-digit numbers can be made from using 2, 5, 6, 7 or 9, if repeats are allowed?
3. Evaluate  .

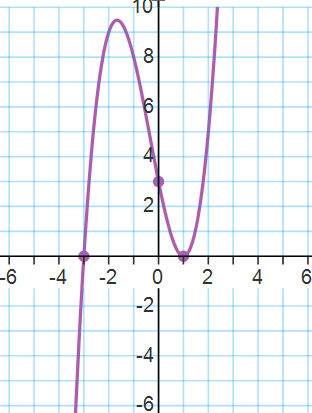
1. Express  in factorial notation.
2. How many arrangements are possible for the word **MERMAID**?

1. What is the seventh element of row twelve of Pascal’s Triangle?

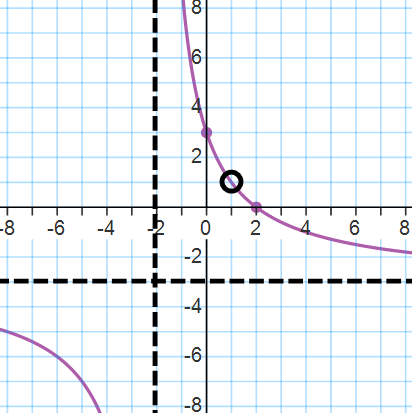
1. Determine the fifth term of the expansion of .
2. What is the domain and range of the function ?
3. What is the domain and range of the function ?
4. Determine an equation for the following graph.



1. Determine the equation in factored form for the following graph.



1. When  is divided by , the remainder is 12. Determine the value of *k*.
2. Write the equations of any vertical and horizontal asymptotes for the function .
3. Determine the equation in factored form for the following graph.



1. Determine the following limits, if they exist.
2. 
3. 
4. In an arithmetic sequence,  and . What is the common difference?
5. Find the missing terms in the following ***geometric sequence*** :

{4, \_\_, \_\_, 108, …}

1. Find the sum of the following series: 
2. Express  as a fraction.

**OPEN RESPONSE:**

1. Lunch is made up of an entrée, a side dish, and a drink. The entrées choices are pasta, pizza, or a burger. Side dishes are fries or a salad. Drink choices are milk, pop, or juice. How many unique lunches are possible?

Draw a tree diagram to illustrate all the possible combinations.

1. If 1 9 36 84 126 126 … is part of a row in Pascal’s Triangle:

a) Finish this row

b) Write the first four elements of the next row.

1. In each of the following, state whether you are dealing with a permutation or a combination, then solve for the number of possibilities.
2. How many ways can you arrange 6 books on a shelf?
3. How many ways can you take 4 candies from a jar containing 12?
4. The ice-cream parlor has 12 flavours and you want to taste some of them before purchasing an ice-cream cone.

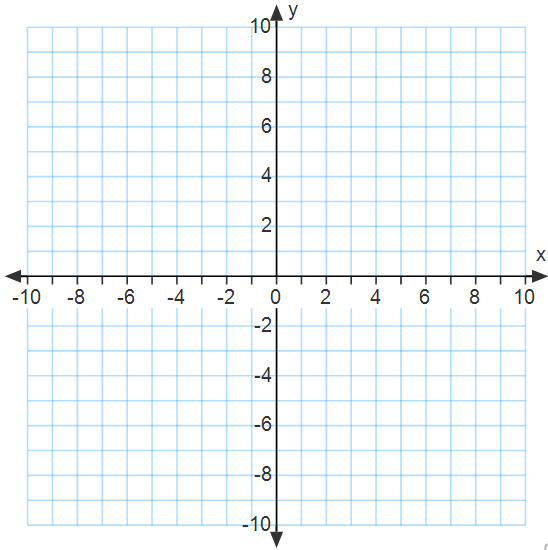
a) How many ways can you try exactly 8 flavours?

b) How many ways can you try at least 8 flavours?

1. Use the Binomial Theorem to expand the following expressions.

a) b)  c) 

1. Sketch the graph of . Then determine the x-intercept, y-intercept, domain and range.



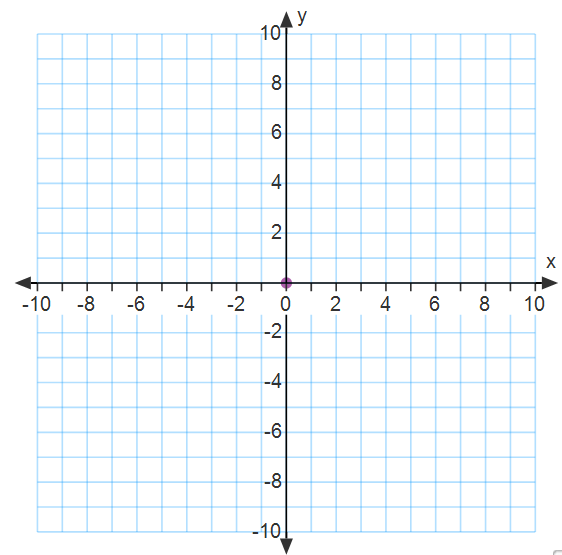
x-intercept:

y-intercept:

Domain:

Range:

1. Solve the equation graphically and algebraically. Be sure to check for extraneous solutions.





1. Completely factor the following equations.
   1. 
   2. 
   3. 
   4. 
2. For the following function: 

a) Factor completely.

b) State the x-intercepts of the graph.

c) State the y-intercept of the graph.

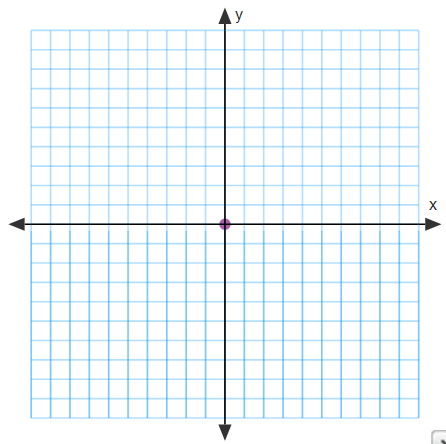
d) Make a rough sketch of the graph showing all intercepts.

e) Determine the intervals where the function is positive.

f) Determine the intervals where the function is negative.

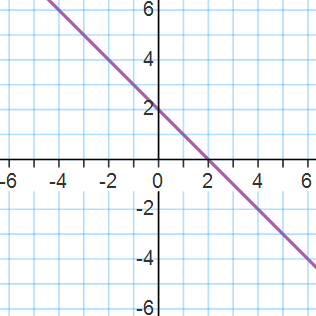
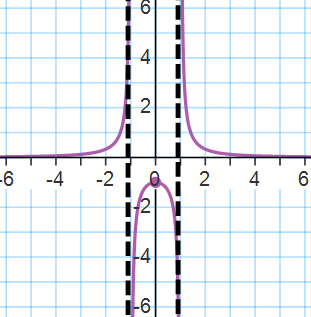
1. Rectangular blocks of ice are cut up and used to build the front entrance of an ice castle. The volume, in cubic feet, of each block is represented by , where x is a positive real number. What are the factors, in terms of x, that represent possible dimensions of each block?
2. Perform the division  . Express the result in the form , and identify any restrictions on the variable.
3. Complete the details, check end-behavior, and then sketch the following.





1. Point(s) of Discontinuity:
2. x-intercept(s):
3. Vertical Asymptote(s):
4. y-intercept:
5. Horizontal Asymptote(s):
6. Domain:
7. Solve for x. Remember to check for extraneous solutions.



1. Sketch the graph of the reciprocal function for each of the following. Clearly indicate any invariant points.
2. b)

1. Evaluate the following limits, if they exist.
   1. 
   2. 
   3. 
   4. 
   5. 
   6. 
   7. 
   8. 
   9. 
   10. 
2. Given the graph of f(x), find the following limits:
   1.  
   2. 
   3. 
   4. 
   5. 
   6. 
3. For what value of is the following function continuous at ?
4. Find the missing terms for the following sequences.
   1. arithmetic: {\_\_, \_\_, 3, \_\_, \_\_, \_\_, 27, …}
   2. geometric: {\_\_, 3, \_\_, \_\_, \_\_, 48, …}
5. Determine the first term, the common difference and the general term, tn, for each of the following arithmetic sequences.
   1.  and 
   2.  and 
6. The sum of the first five terms of a geometric series is 186, and the sum of the first six terms is 378. If the fourth term is 48, find:
   1. the first term
   2. the common ratio
   3. the tenth term
   4. the sum of the first ten terms
7. Evaluate and express the following sums using sigma notation.
   1. 2 + 7 + 12 + … + 57
   2. 35 + 32 + 29 + … + (−4)
   3. 1 + 3 + 9 + 27 + … + 6561
8. The current population of mosquitoes surrounding a lake is 75 000. The population is expected to decrease by 2500 each week after the current week.
   1. Write an expression for the mosquito population in week n.
   2. In which week will the mosquito population reach 40 000?
9. In a movie theatre there are 12 seats in the first row. The next 7 rows increase by 3 seats each and the remaining rows increase by 5 seats. If there are 16 rows in the theatre, how many people can be seated at one time?
10. The Mill has a pile of logs with 34 in the bottom row, 33 logs in the next row, 32 logs in the next row, and so on. If there are 15 logs in the top row, how many logs are there in the pile?
11. Kate has a vintage Ferrari that she bought last year which is now worth $525 000. For the

past several years, these models have increased in value by 8% each year.

* 1. Write an expression for the value of the Ferrari n years after Kate purchased it.
  2. What will be the value of her Ferrari 5 years after she purchased it?
  3. How long will it take for the Ferrari to be worth 1 000 000?

1. In its first year of sap production a maple sugar tree produces 70L of sap. Every year after that sap production decreases by 10%.
2. How much maple sugar is produced in the first 8 years?
3. Estimate the tree’s total sap production.
4. When will the sap production drop below 20L per year?

Pre-Calculus 12B Exam Review - Solutions

**SHORT RESPONSE:**

1. 
2. must end with 5, 7 or 9 to be odd 
3. 
4. 
5. 
6. 
7. 
8. 

Domain:  Range: 

1. ?

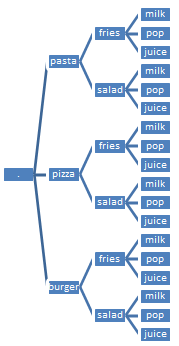
Domain:  Range: 

1. 
2. 

1.  
2. vertical asymptotes: x=2 horizontal asymptote:
3. 
4. 
5. 
6. 
7.  {4, 4x3=12, 12x3=36, 108, …}
8. 
9. 

**OPEN RESPONSE:**

1. There are 3x2x3 = 18 possible lunch combinations



1. a) 1 9 36 84 126 126 84 36 9 1

b) 1 10 45 120

1. Permutation 6!=720
2. Combination 
3. a) 

b) 

1. a)



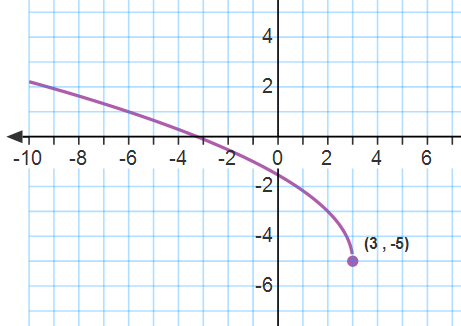
b)



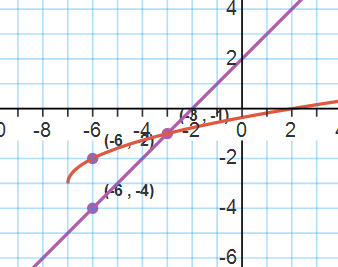
c)



x-intercept: y-intercept: Domain:  Range: 

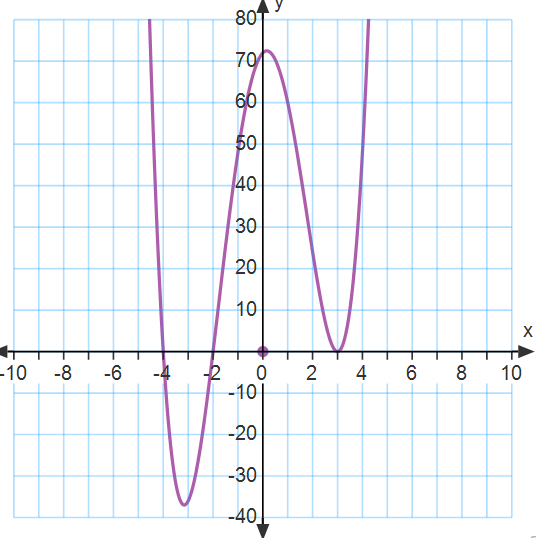


1. 1. 
   2. 
   3. 
   4. Requires synthetic or long division.



1. 
2. Factor completely: 

b) x-intercepts: x=-4, -2, 3, 3

c) y-intercept: y=72

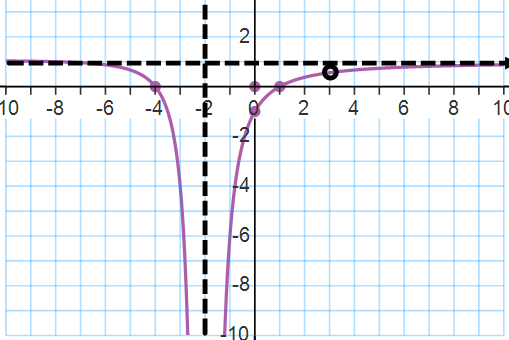
d) sketch of the graph shown to the right

e) positive: 

f) negative: 

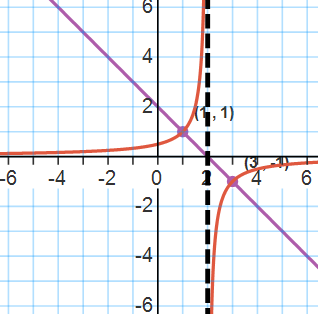
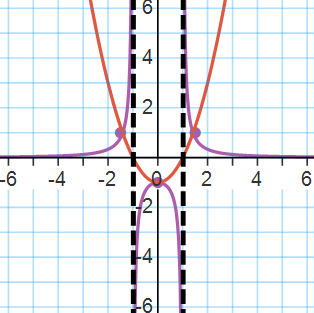
1. Requires synthetic or long division. 



1. PoD: 
2. x-intercept(s): x=-4, 1
3. Vertical Asymptote(s): x=-2, -2
4. y-intercept: y=-1
5. Horizontal Asymptote(s): y=1
6. Domain: 



1. 
2. b)

* 1. 
  2. 
  3. 
  4. 
  5. 
  6. 
  7. 
  8. 
  9. 
  10. 

1. Given the graph of f(x), find the following limits:
   1.  
   2. 
   3. 
   4. 
   5. 
   6. 



* 1. arithmetic:

   {-9, -3, 3, 9, 15, 21, 27, …}

* 1. geometric:

   {3/2, 3, 6, 12, 24, 48, …}

* 1. 2 + 7 + 12 + … + 57

* 1. 35 + 32 + 29 + … + (−4)

* 1. 1 + 3 + 9 + 27 + … + 6561

* 1.  



1. There are 2 patterns here, the first eight rows and the last eight rows.

first eight rows

Last eight rows

Therefore the total number of seats is 180+444=624 seats.

Or expand the series: 12+15+18+21+24+27+30+33+38+43+48+53+58+63+68+73=624 seats

* 1.  







