Are you ready for Calculus?

1. Simplify: a)  b)  c)  d) 

2. Rationalize the denominator: a)  b)  c) 

3. Simplify the following expressions:

a)  b)  c)  d)  e)  f) 

4. Solve for x (do not use a calculator):

a)  b)  c)  d) 

5. Simplify: a)  b) 

6. Simplify: a)  b)  c) 

7. Solve the following equations for the indicated variables:

a) , for a b) , for a

c) , for positive r d) , for P

e) , for d f) , for x

8. Factor completely:

a) *x*6 *−* 16*x*4 b) 4*x*3 *−* 8*x*2 *−* 25*x* + 50 c) 8*x*3 + 27 d) *x*4 *–* 1

9. Find all real solutions to:

a) *x*6 *−* 16*x*4 = 0 b) 4*x*3 *−* 8*x*2 *−* 25*x* + 50 = 0 c) 8*x*3 + 27 = 0

10. Solve for *x*:

a) 3 sin2 *x* = cos2 *x* ; 0 *≤ x <* 2*π* b) cos2 *x −* sin2 *x* = sin *x* ;*−π < x ≤ π*

c) tan *x* + sec *x* = 2 cos *x ;*

11. Solve the equations: a)  b)  c) 

12. Determine the equations of the following lines:

a) the line through (-1,3) and (2,-4)

b) the line through (-1,2) and perpendicular to the line 2x-3y+5=0.

c) the line through (2,3) and the midpoint of the line segment from (-1,4) to (3,2).

13. Find the point of intersection of the lines: 3*x − y −* 7 = 0 and *x* + 5*y* +3 = 0

14. Simplify , where a)  b)  c) 

15. The graph of the function *y* = *f* (*x*) is given as follows: Determine the graphs of the functions:



a) *f* (*x* + 1) b) *f* (*−x*)

c) *|f* (*x*)*|* d) *f* (*|x|*)

16. a) The equation has a solution x=2. Find all other solutions using long division.

b) Solve for x, the equation. All solutions are rational and between -1 and 1.

17. a) Find the ratio of the area inside the square but outside the circle to the area of the square in the picture (a) below.

b) Find a formula for the perimeter of a window of the shape in the picture (b) above.

c) A water tank has the shape of a cone (like an ice cream cone without the ice cream). The tank is 10m high and has a radius of 3m at the top. If the water is 5m deep (in the middle) what is the surface area of the top of the water?

d) Two cars start moving from the same point. One travels south at 100km/hour, the other west at 50 km/hour. How far apart are they two hours later?

e) A kite is 100m above the ground. If there are 200m of string out, what is the angle between the string and the horizontal? (Assume that the string is perfectly straight.)

Things you should know by heart for Calculus

Find the following and memorize

Slope and Linear Equations:

The slope of the line through points and :

The relationship of the slopes of parallel lines with slopes m1 and m2:

The relationship of the slopes of perpendicular lines with slopes m1 and m2:

The point/slope equation of a line:

The standard equation of a line:

The slope/intercept equation of a line:

Factoring:

The difference between two squares:

The difference of two cubes:

The sum of two cubes:

The perfect square trinomial:

Distance, Quadratic, and Midpoint Formulas:

State the distance formula for the distance between points and :

State the quadratic formula for finding the roots to the quadratic equation :

State the midpoint of the line segment between points and :

Asymptotes of Rational Functions:

What are the zeros of the numerator:

What are the zeros of the denominator:

How do you get a removable discontinuity:

How do you find a horizontal asymptote:

How do you find a slant asymptote:

Parent Functions:

You need to know the a) equation, b) graph, c) domain, and d) range of the following:

Constant, Identity, Quadratic, Absolute Value, Rational, Square Root, Cubic, Cube Root, Sine Cosine, and Tangent

Trig Identities:

You need to know all of the following identities: Quotient, Reciprocal, Pythagorean, and Double Angle

Trig Values:

You should know all the values of sine, cosine, and tangent for the unit circle using radian measures without sketching the unit circle.