A) _____   D) _____

B) _____   E) (_____ , _____ , _____)

C) _____   F) (_____ , _____)

**** NO CALCULATORS ON THIS ROUND ****

A) In $\triangle ABC$, $AB = 10$, $AC = 12$ and $m\angle B = 2m\angle A$.
   If A is the smallest angle in $\triangle ABC$, compute BC.

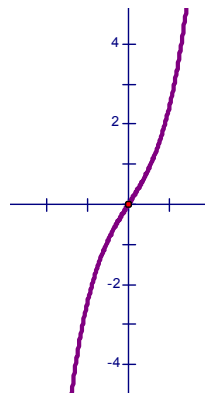B) Using the letters, arrange the following in order from largest to smallest.
   $A = (16,874,535)^{5000}g(16,874,537)^{5000}$
   $B = (16,874,533)^{5000}g(16,874,539)^{5000}$
   $C = (16,874,536)^{5000}g(16,874,536)^{5000}$
   $D = (16,874,534)^{5000}g(16,874,538)^{5000}$

C) Three vertices of <u>rectangle</u> $PQRS$ are $P(-8, -1)$, $Q(k, k)$ and $R(14, 2)$.
   Determine <u>all</u> possible coordinates (x, y) of vertex S.

D) The graph of $y = \dfrac{5^x - 5^{-x}}{2}$ is shown at the right.
   Solve for x in terms of y.

E) My son, his daughter (my granddaughter) and I have the same birthday! I was 21 when my
   son was born. On our next birthday, our combined ages will total 100 years, and when my
   granddaughter turns 25, the ratio of my age to my son's age will be 3 : 2.
   Compute the ordered triple (g, s, f), where g, s and f denote the ages of
   granddaughter, son and father respectively on our next birthday.

F) Eight points lie on a circle and form the vertices
   of an octagon. Let M and m denote the maximum and
   minimum number of <u>interior</u> points of intersection of
   the diagonals respectively, i.e. <u>excluding</u> the vertices
   of the octagon. Determine the ordered pair (M, m).
   The diagram at the right shows a <u>regular</u> octagon
   $ABCDEFGH$ with all its diagonals.