**Trigonometry 3**

**1.** Express in the form , where and .

Hence,

(i) find the maximum value of and the corresponding angle, at which the maximum value occurs.

(ii) Solve for .

, where and

(i)

Since ,

Therefore, the maximum of is 4.

Maximum occurs when

When , , where .

When , , where .

(ii)

Since , .

**2.** Prove **(i)** **(ii)**

If , then the principal values of .

**(i)** **Method 1**

**Method 2**

Let

Integrate, , a constant.

Put

Hence,

**Method 3**

**(ii)**

**3.** Prove :

**4.** Solve the equation by expressing in the form ,

where

Squaring,

Put ,

We get

, where n is an integer.

Since

Or

Note that squaring an equation may create roots, since

Therefore is rejected.

**5.** Prove that :

Let be the proposition: .

We like to use the Principle of Mathematical Induction to prove that is true .

For . is true.

Assume is true for some , that is,

For , , by (\*)

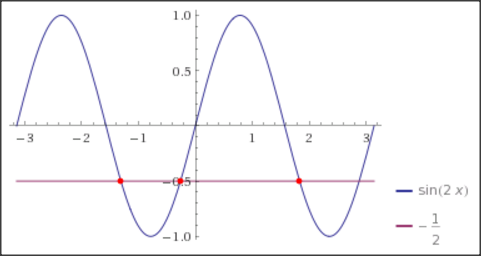
is true.

By the Principle of Mathematical Induction, is true .

**6.** **(i)** Find the set of values of x in the interval such that .

**(ii)** From **(i)**, find the set of values of x in the interval such that

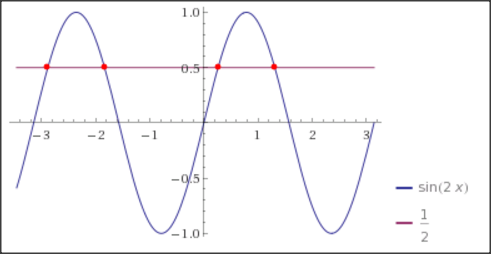
**(i)**

 For ,

, where .

Hence for ,

For ,

 , where .

Hence for ,

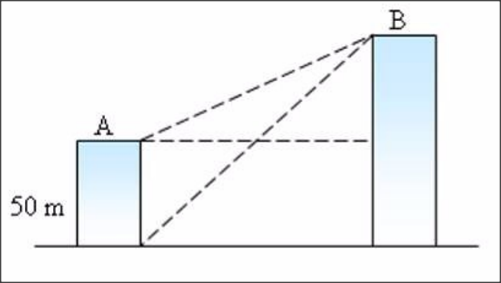
For , the solution is the union of (1) and (2),

**(ii)**

**7.** Referring to the diagram, building A is measured with 50 m in height. The angle from the base of the building A to the highest point of building B is measured as . The angle formed from the rooftop of building A right to the highest point of building B is . What is the distance that keeps the two buildings apart?

**Method 1**

Let . .



C

D

E

**Method 2**

By Sine Law,

**Method 3**

Apply Cosine Law to ,

**8.** It is given that .

**(a)** Express in the form of , where a, b and c are constants.

**(b)** Show that can be expressed in the form of , where r and c are constants and .

**(c)** Find the maximum and minimum values of the express .

**(d)** Find the values of x between and such that .

**(e)** Find the set of values of x in the interval such that .

**(a)**

.

**(b)**

, where .

.

**(c)**

. Max of and min. of .

**(d)**

When

or

**(e)**

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