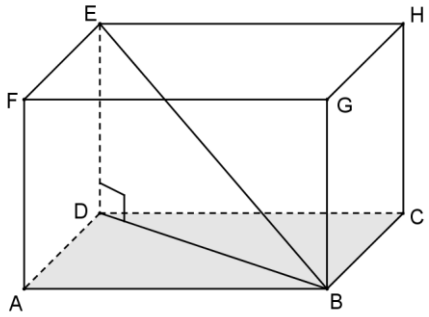
Worksheet 2 – Angles between Lines and Planes

Name ：_____（ ） Class：_____ Date：_____

I. In each of the following figures, write down the projection of the given segment on the shaded plane and the angle between them. Also draw the projection and mark the right angle in the figure, as shown in the example.

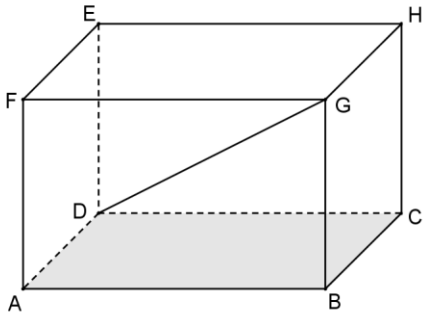
Example




Projection of *EB* on plane *ABCD* : *DB*

Angle between *EB* and plane *ABCD*: $\angle EBD$

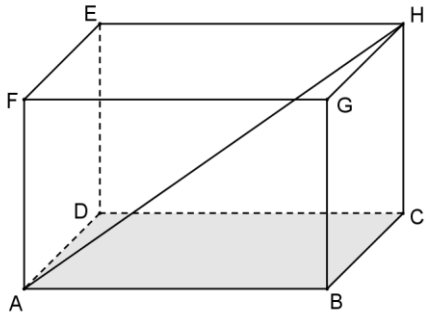
1.




Projection of *GD* on plane *ABCD* : _____

Angle between *GD* and plane *ABCD*: _____

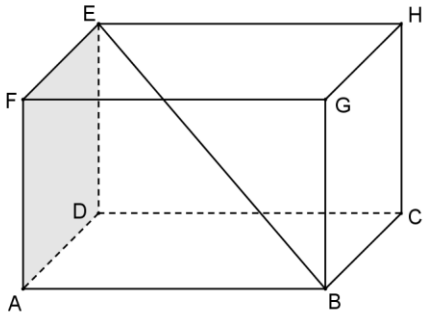
2.




Projection of *HA* on plane *ABCD* : _____

Angle between *HA* and plane *ABCD*: _____

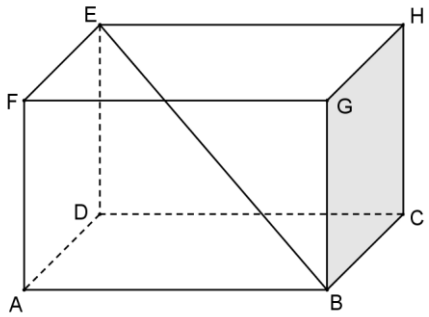
3.




Projection of *BE* on plane *ADEF* : _____

Angle between *BE* and plane *ADEF*: _____

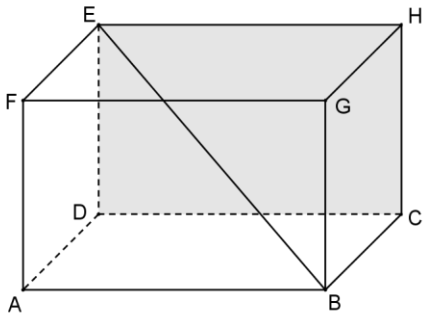
4.




Projection of *EB* on plane *BCHG* : _____

Angle between *EB* and plane *BCHG*: _____

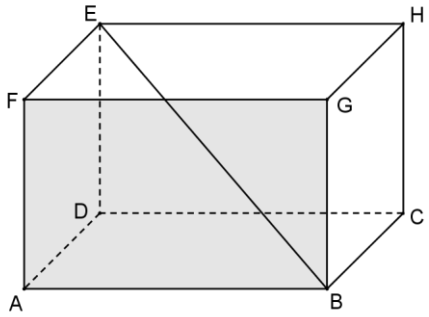
5.




Projection of *BE* on plane *CDEH* : _____

Angle between *BE* and plane *CDEH*: _____

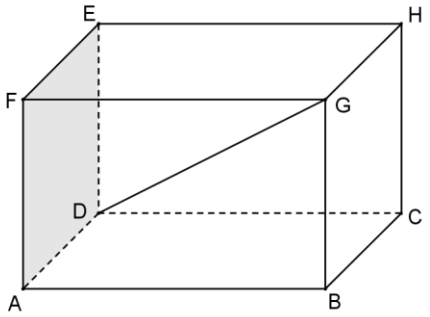
6.




Projection of *EB* on plane *ABGF* : _____

Angle between *EB* and plane *ABGF*: _____

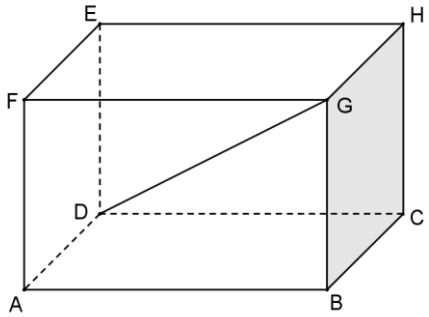
7.




Projection of *GD* on plane *ADEF* : _____

Angle between *GD* and plane *ADEF*: _____

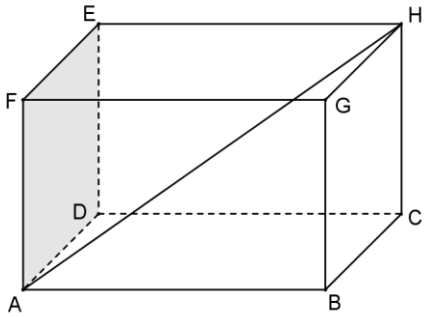
8.




Projection of *DG* on plane *BCHG* : _____

Angle between *DG* and plane *BCHG*: _____

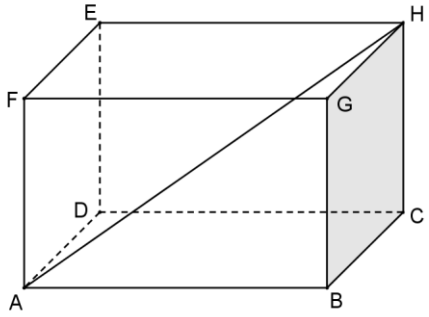
9.




Projection of *HA* on plane *ADEF* : _____

Angle between *HA* and plane *ADEF*: _____

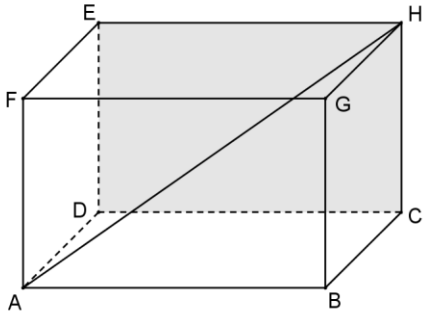
10.




Projection of *AH* on plane *BCHG* : _____

Angle between *AH* and plane *BCHG*: _____

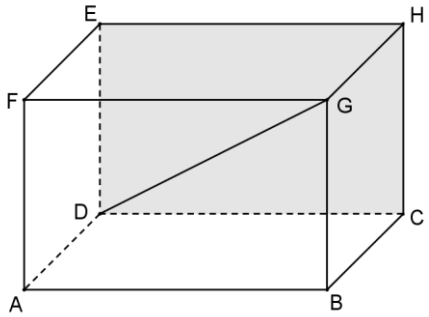
11.




Projection of *AH* on plane *CDEH* : _____

Angle between *AH* and plane *CDEH*: _____

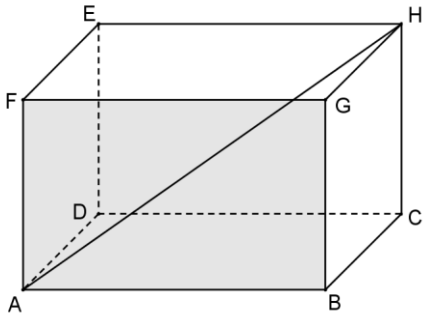
12.




Projection of *GD* on plane *CDEH* : _____

Angle between *GD* and plane *CDEH*: _____

13.

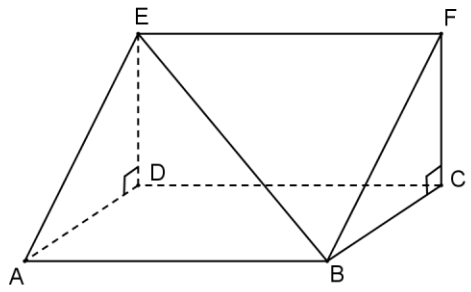



Projection of *HA* on plane *ABGF* : _____

Angle between *HA* and plane *ABGF*: _____

II. Each of the figures below shows a triangular prism *ABCDEF*. *ABCD* and *DCFE* are rectangles. Write down the projection of the given segment on the plane and the angle between them.

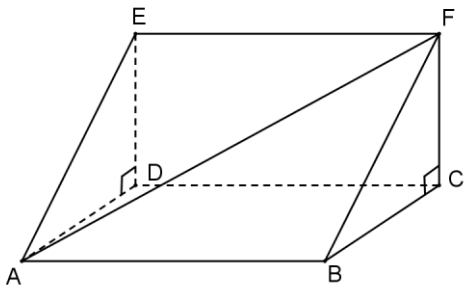
1. .




Projection of *EB* on plane *ABCD* : _____

Angle between *EB* and plane *ABCD*: _____

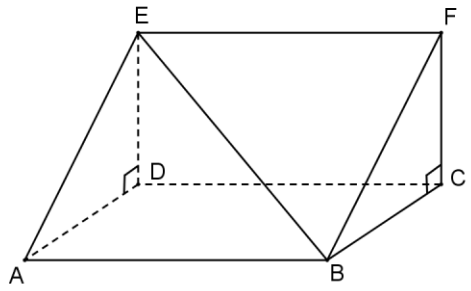
2. .




Projection of *FA* on plane *ABCD* : _____

Angle between *FA* and plane *ABCD*: _____

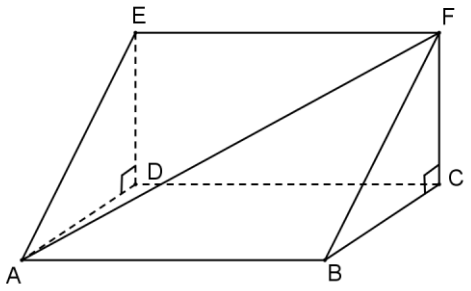
3.




Projection of *BE* on plane *CDEF* : _____

Angle between *BE* and plane *CDEF*: _____

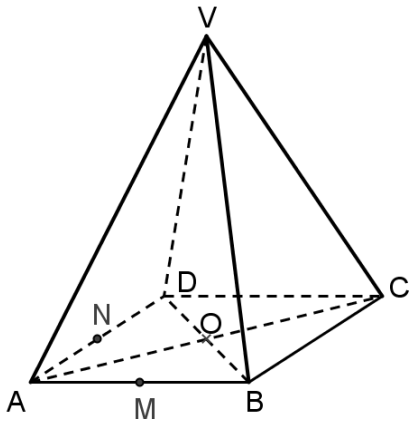
4.




Projection of *AF* on plane *CDEF* : _____

Angle between *AF* and plane *CDEF*: _____

III. *VABCD* shows a right rectangular pyramid *VABCD*. *ABCD* is a rectangle. *O* is the intersection of *AC* and *BD*.



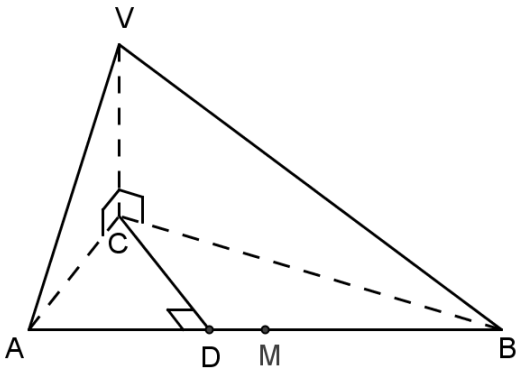

(a) Write down the projections of *VA* and *VB* on the plane *ABCD*.

Projection of *VA* on plane *ABCD*: _____ Projection of *VB* on plane *ABCD*: _____

(b) Write down the angle of *VA* and *VB* on the plane *ABCD*.

Angle between *VA* and plane *ABCD*: _____ Angle between *VB* and plane *ABCD*: _____

IV. *VABC* is a triangular pyramid with altitude *VC*. *CD is* perpendicular to *AB*. *M* is the mid-point of *AB*.




(a) Write down the projection of *VA*, *VD*, *VM* and *VB* on the plane *ABC*.

Projection of *VA* on plane *ABC*: _____ Projection of *VD* on plane *ABC*:_____

Projection of *VM* on plane *ABC*:_____ Projection of *VB* on plane *ABC*:_____

(b) Write down the angle of *VA*, *VD*, *VM* and *VB* on the plane *ABC*.

Angle of *VA* on plane *ABC*:_____ Angle of *VD* on plane *ABC*: _____

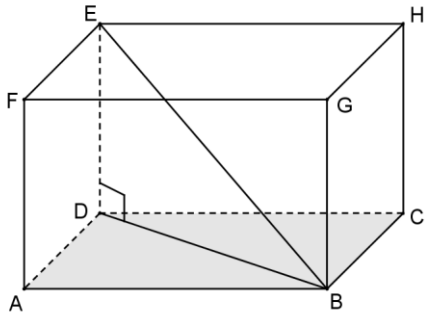
Angle of *VM* on plane *ABC*:_____ Angle of *VB* on plane *ABC*: _____

Worksheet 2 – Angles between Lines and Planes (Answer)

Name ：_____（ ） Class：_____ Date：_____

I. In each of the following figures, write down the projection of the given segment on the shaded plane and the angle between them. Also draw the projection and mark the right angle in the figure, as shown in the example.

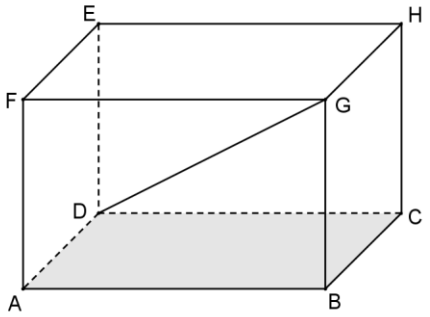
Example




Projection of *EB* on plane *ABCD* : *DB*

Angle between *EB* and plane *ABCD*: ∠*EBD*

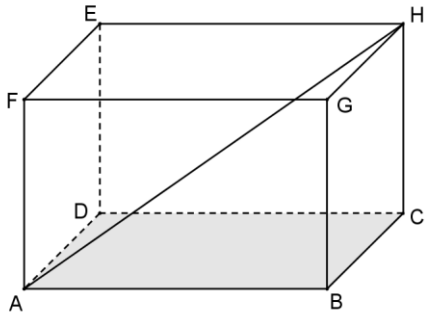
1.




Projection of *GD* on plane *ABCD* : BD

Angle between *GD* and plane *ABCD*: ∠BDG

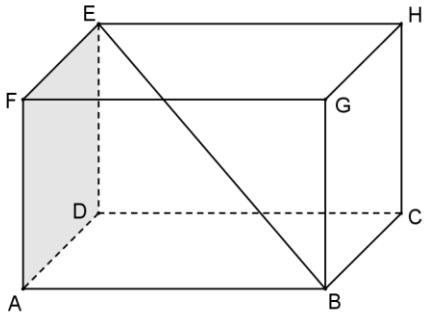
2.




Projection of *HA* on plane *ABCD* : AC

Angle between *HA* and plane *ABCD*: ∠CAH

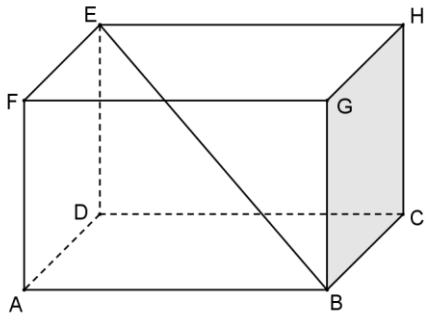
3.




Projection of *BE* on plane *ADEF* : AE

Angle between *BE* and plane *ADEF*: ∠AEB

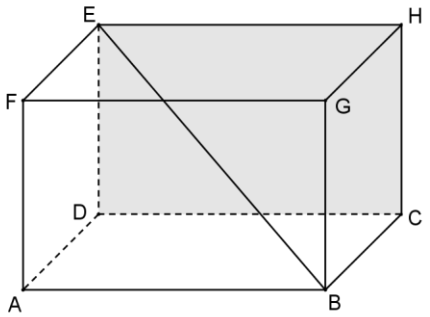
4.




Projection of *EB* on plane *BCHG* : BH

Angle between *EB* and plane *BCHG*:∠EBH

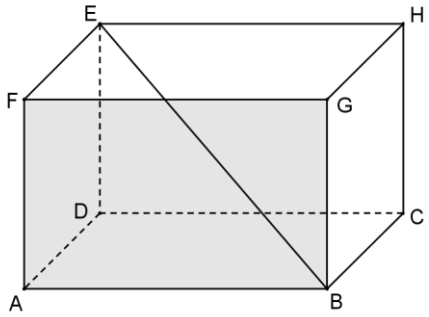
5.




Projection of *BE* on plane *CDEH* : CE

Angle between *BE* and plane *CDEH*: ∠CEB

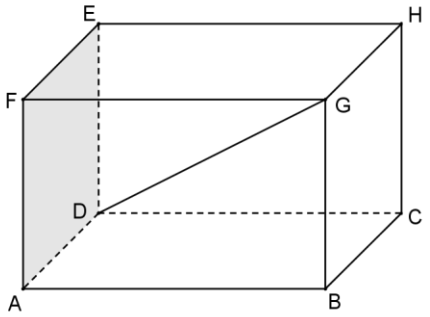
6.




Projection of *EB* on plane *ABGF* : BF

Angle between *EB* and plane *ABGF*: ∠EBF

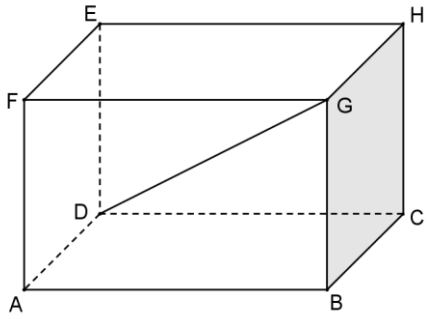
7.




Projection of *GD* on plane *ADEF* : DF

Angle between *GD* and plane *ADEF*: ∠FDG

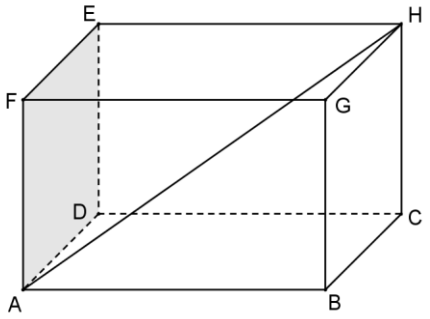
8.




Projection of *DG* on plane *BCHG* : CG

Angle between *DG* and plane *BCHG*: ∠DCG

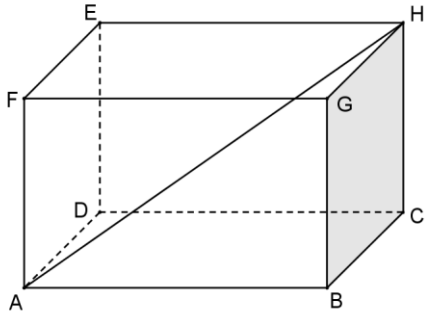
9.




Projection of *HA* on plane *ADEF* : AE

Angle between *HA* and plane *ADEF*: ∠EAH

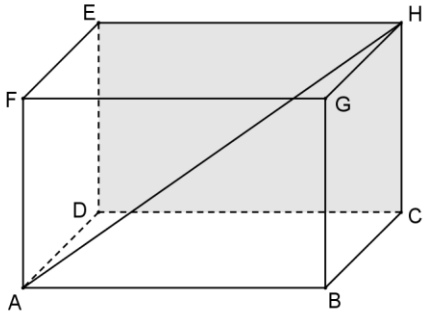
10.




Projection of *AH* on plane *BCHG* : BH

Angle between *AH* and plane *BCHG*: ∠AHB

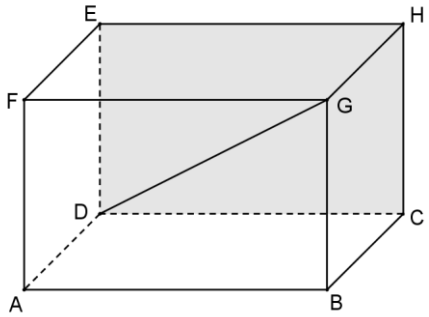
11.




Projection of *AH* on plane *CDEH* : DH

Angle between *AH* and plane *CDEH*: ∠DHA

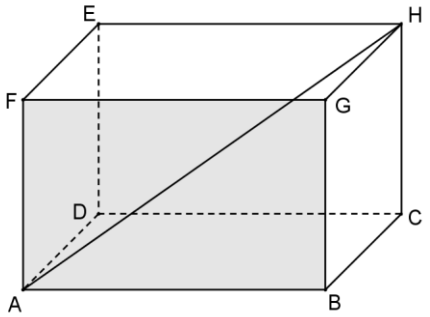
12.




Projection of *GD* on plane *CDEH* : DH

Angle between *GD* and plane *CDEH*: ∠GDH

13.

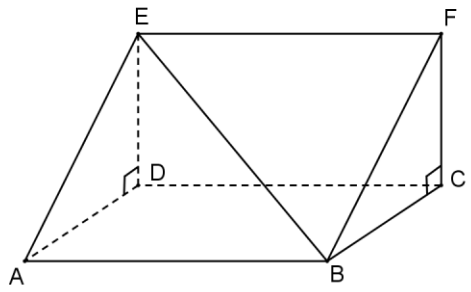



Projection of *HA* on plane *ABGF* : AG

Angle between *HA* and plane *ABGF*: ∠GAH

V. Each of the figures below shows a triangular prism *ABCDEF*. *ABCD* and *DCFE* are rectangles. Write down the projection of the given segment on the plane and the angle between them.

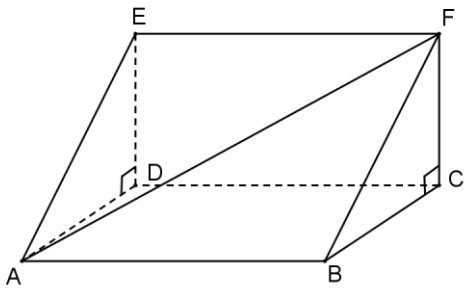
5. .




Projection of *EB* on plane *ABCD* : DB

Angle between *EB* and plane *ABCD*: ∠DBE

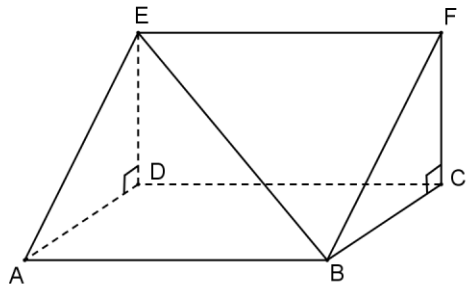
6. .




Projection of *FA* on plane *ABCD* : AC

Angle between *FA* and plane *ABCD*: ∠CAF

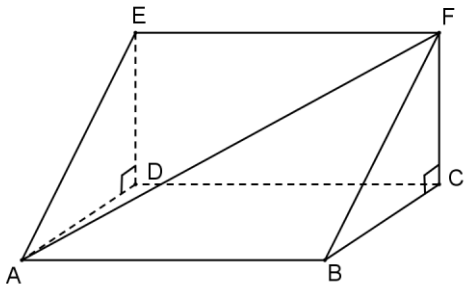
7.




Projection of *BE* on plane *CDEF* : CE

Angle between *BE* and plane *CDEF*: ∠BEC

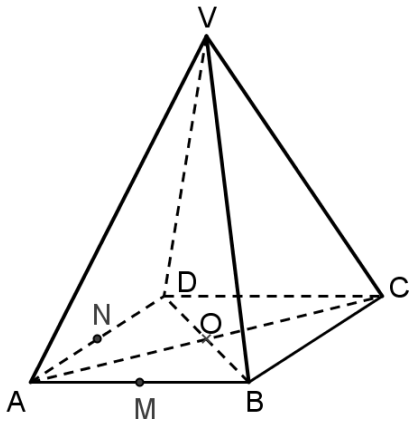
8.




Projection of *AF* on plane *CDEF* : DF

Angle between *AF* and plane *CDEF*: ∠AFD

II. *VABCD* shows a right rectangular pyramid *VABCD*. *ABCD* is a rectangle. *O* is the intersection of *AC* and *BD*.



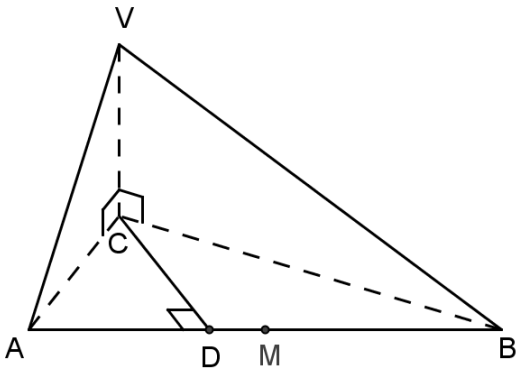

(c) Write down the projection of *VA* and *VB* on the plane *ABCD*.

Projection of *VA* on plane *ABCD*: AO  Projection of *VB* on plane *ABCD*: BO

(d) Write down the angle of *VA* and *VB* on the plane *ABCD*.

Angle between *VA* and plane *ABCD*: ∠VAO  Angle between *VB* and plane *ABCD*: ∠VBO

III. *VABC* is a triangular pyramid with altitude *VC*. *CD* is perpendicular to *AB*. *M* is the mid-point of *AB*.




(c) Write down the projection of *VA*, *VD*, *VM* and *VB* on the plane *ABC*.

Projection of *VA* on plane *ABC*: AC

Projection of *VD* on plane *ABC*: CD

Projection of *VM* on plane *ABC*: CM

Projection of *VB* on plane *ABC*: CB

(d) Write down the angle of *VA*, *VD*, *VM* and *VB* on the plane *ABC*.

Angle of *VA* on plane *ABC*: ∠VAC

Angle of *VD* on plane *ABC*: ∠VDC

Angle of *VM* on plane *ABC*: ∠VMC

Angle of *VB* on plane *ABC*: ∠VBC