INTERSECTION OF SOLIDS

WHEN ONE SOLID PENETRATES ANOTHER SOLID THEN THEIR SURFACES INTERSECT

AND

AT THE JUNCTION OF INTERSECTION A TYPICAL CURVE IS FORMED, WHICH REMAINS COMMON TO BOTH SOLIDS.

THIS CURVE IS CALLED CURVE OF INTERSECTION AND IT IS A RESULT OF INTERPENETRATION OF SOLIDS.

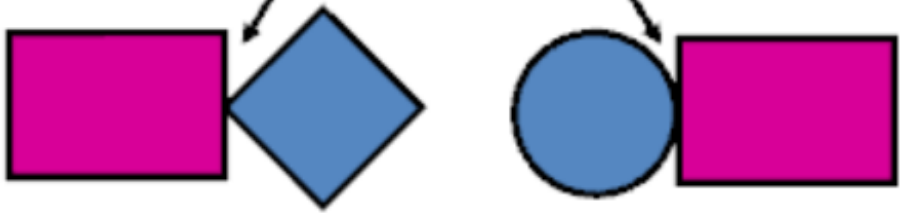
PURPOSE OF DRAWING THESE CURVES:-

WHEN TWO OBJECTS ARE TO BE JOINED TOGATHER, MAXIMUM SURFACE CONTACT BETWEEN BOTH BECOMES A BASIC REQUIREMENT FOR STRONGEST & LEAK-PROOF JOINT.

Curves of Intersections being common to both Intersecting solids, shows exact & maximum surface contact of both solids.

Study Following Illustrations Carefully.

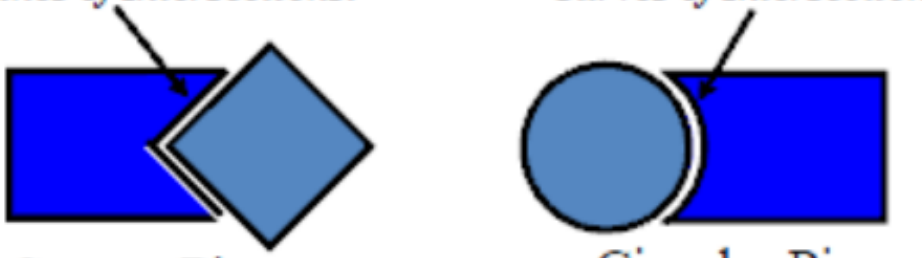
Minimum Surface Contact.
(Point Contact)



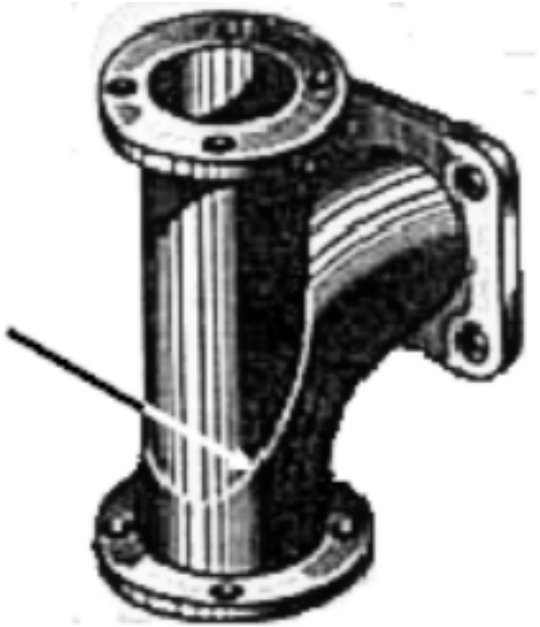
Square Pipes. Circular Pipes.

(Maximum Surface Contact)

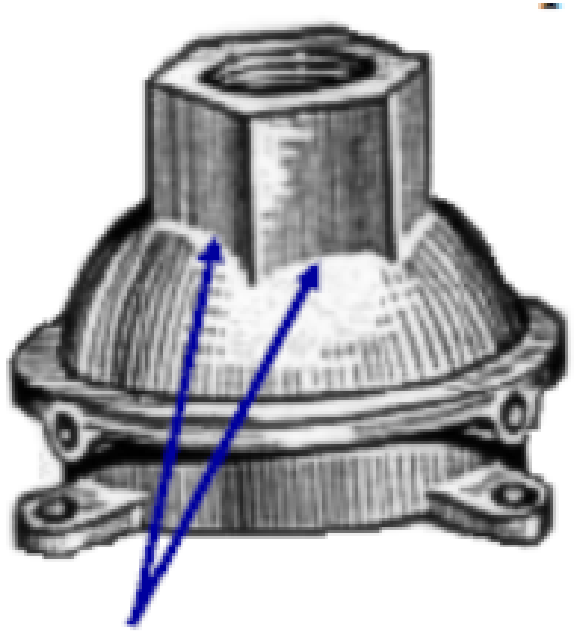
Lines of Intersections. *Curves of Intersections.*



Square Pipes. Circular Pipes.



Intersection of Main Pipe and Branch Pipe



Pump lid Having shape of Hexagonal Prism and Hemi-sphere Intersecting each other.

COMMON SOLUTION STEPS

- One solid will be standing on HP
- Other will penetrate horizontally.
- Draw three views of standing solid.
- Name views as per the illustrations.
- Beginning with side view draw three Views of penetrating solids also.
- On it’s S.V. mark number of points And name those (eitherletters or nos.)

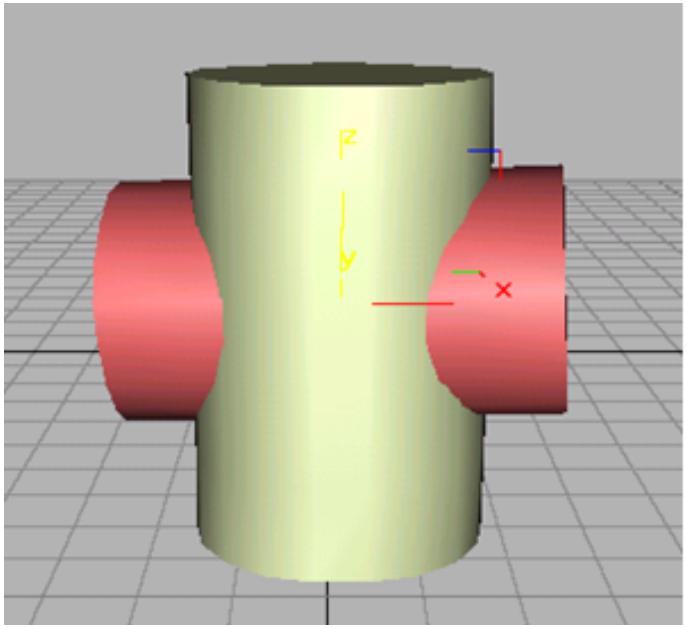
- The points which are on standard generators or edges of standing solid, (in S.V.) can be marked on respective generators in Fv and Tv. And other points from SV should be brought to Tv first and then projecting upward To Fv.

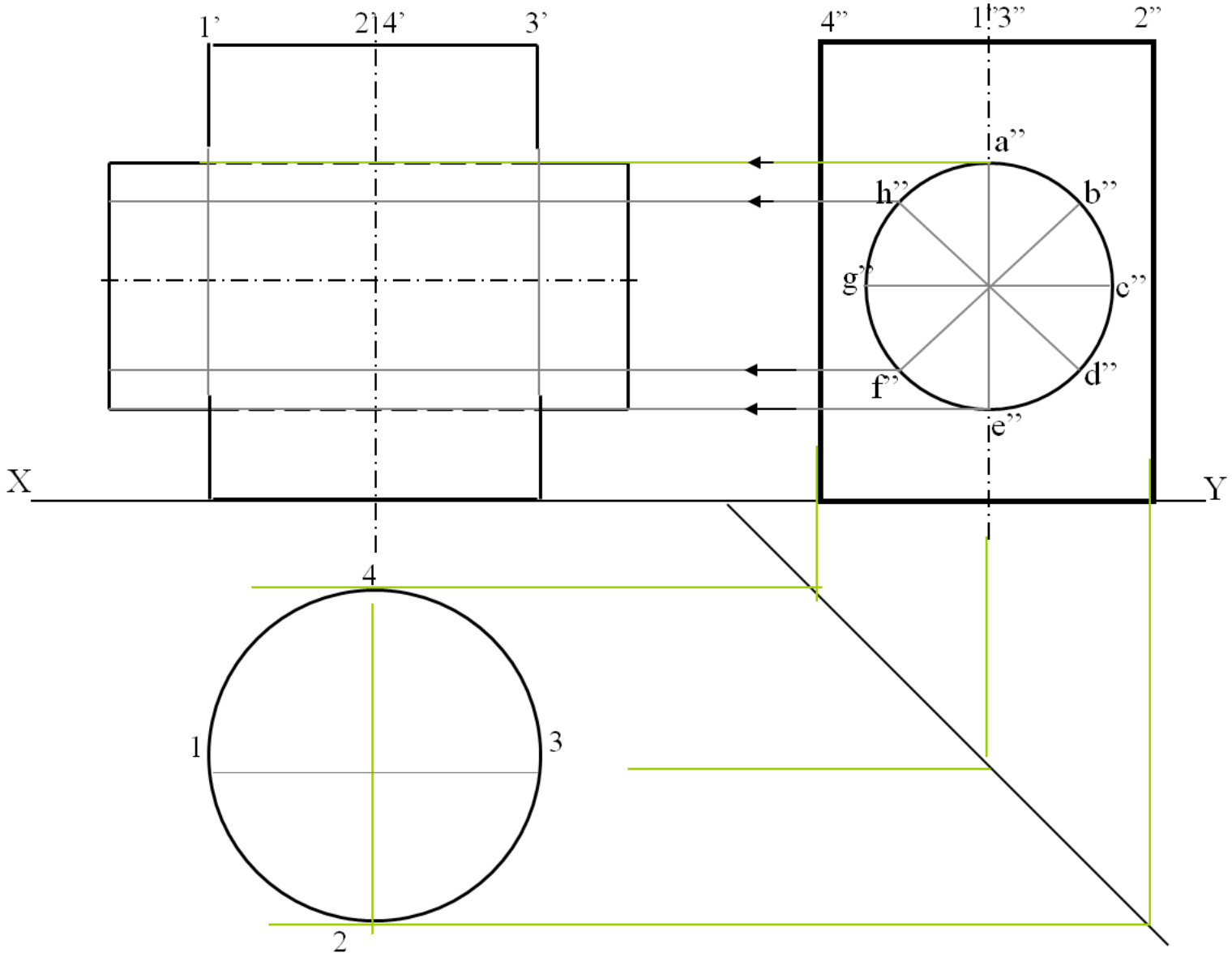
- Dark and dotted line’s decision should be taken by observing side view from it’s right side as shown by arrow.

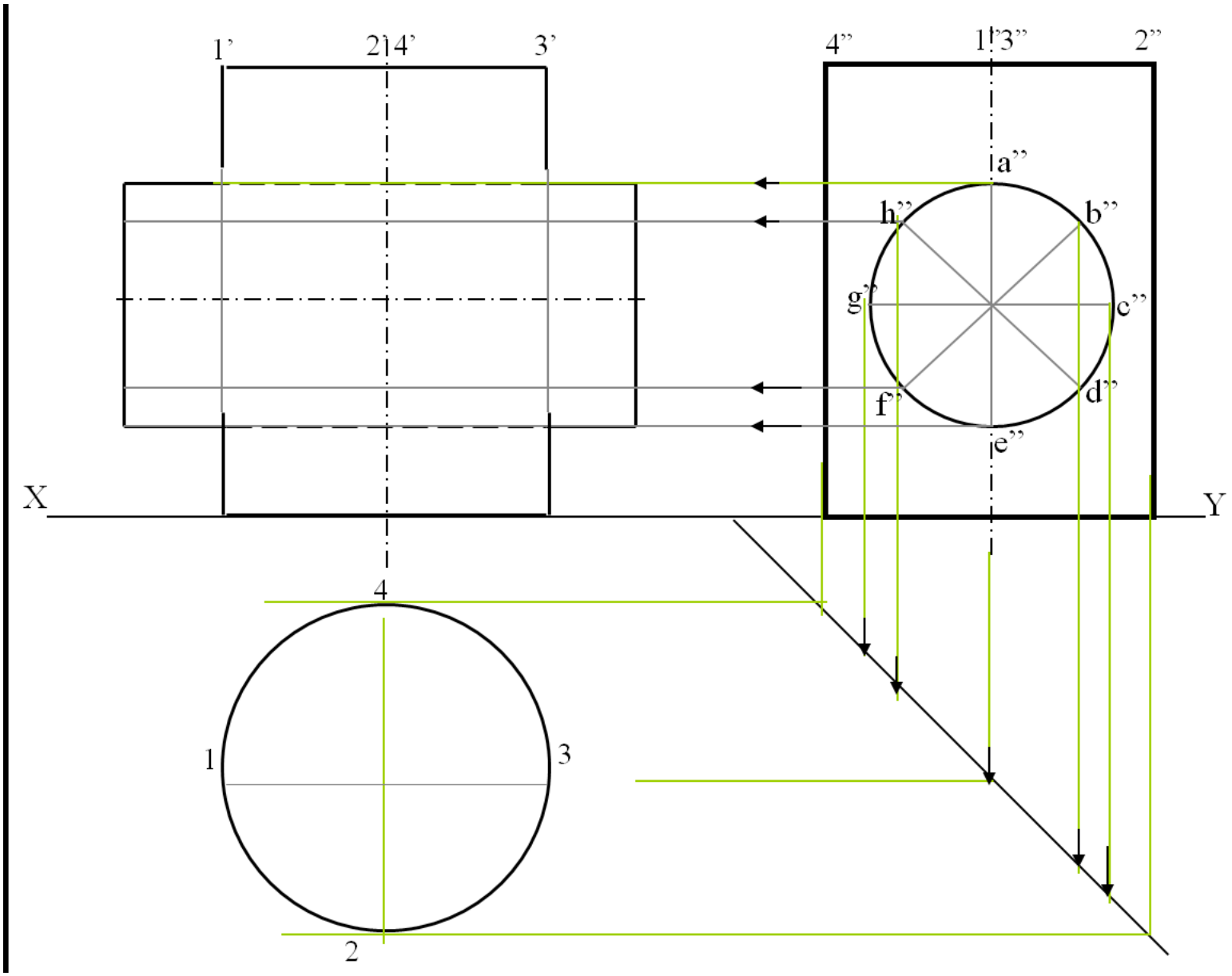
- Accordingly those should be joined by curvature or straight lines.

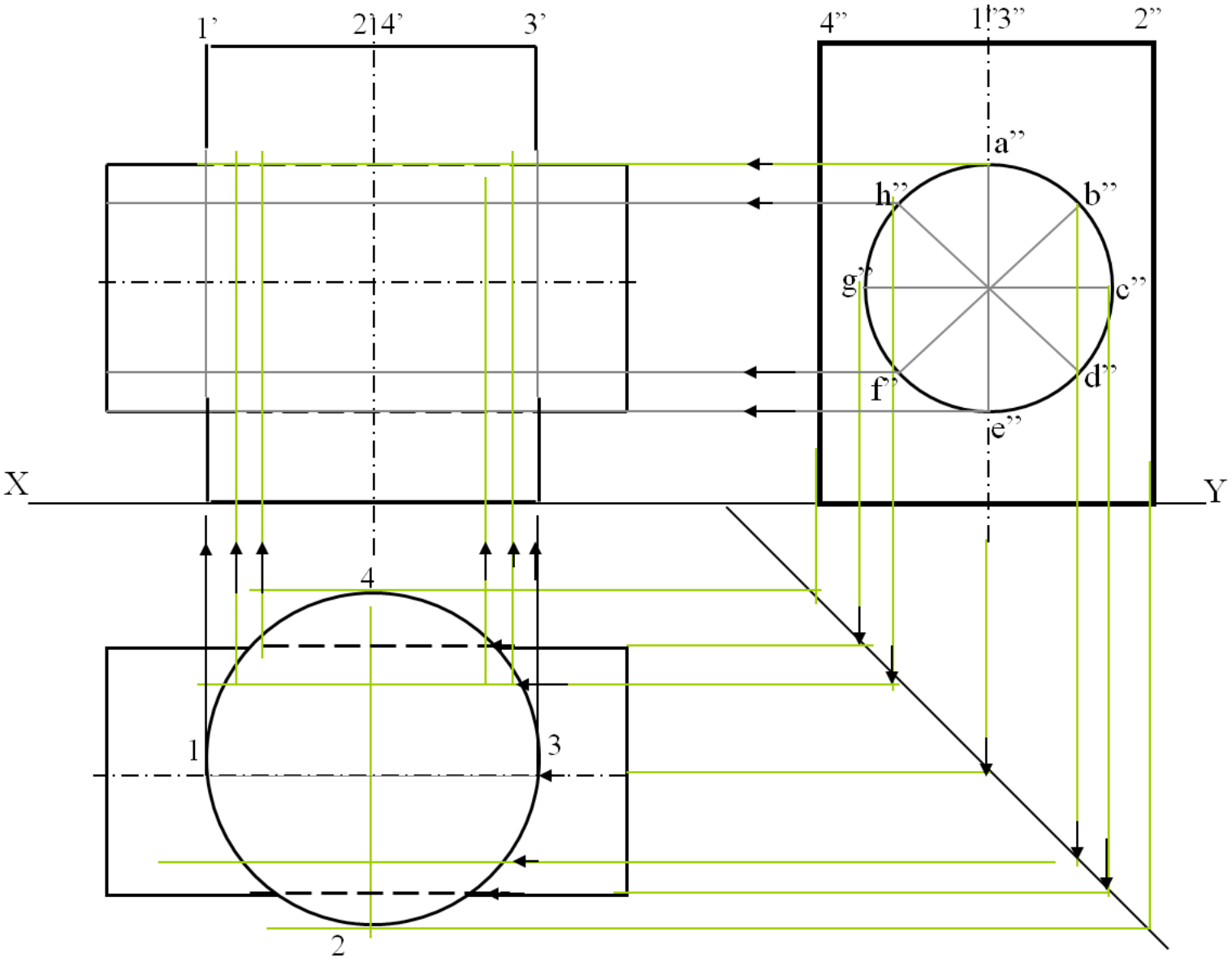
CYLINDER STANDING & CYLINDER PENETRATING

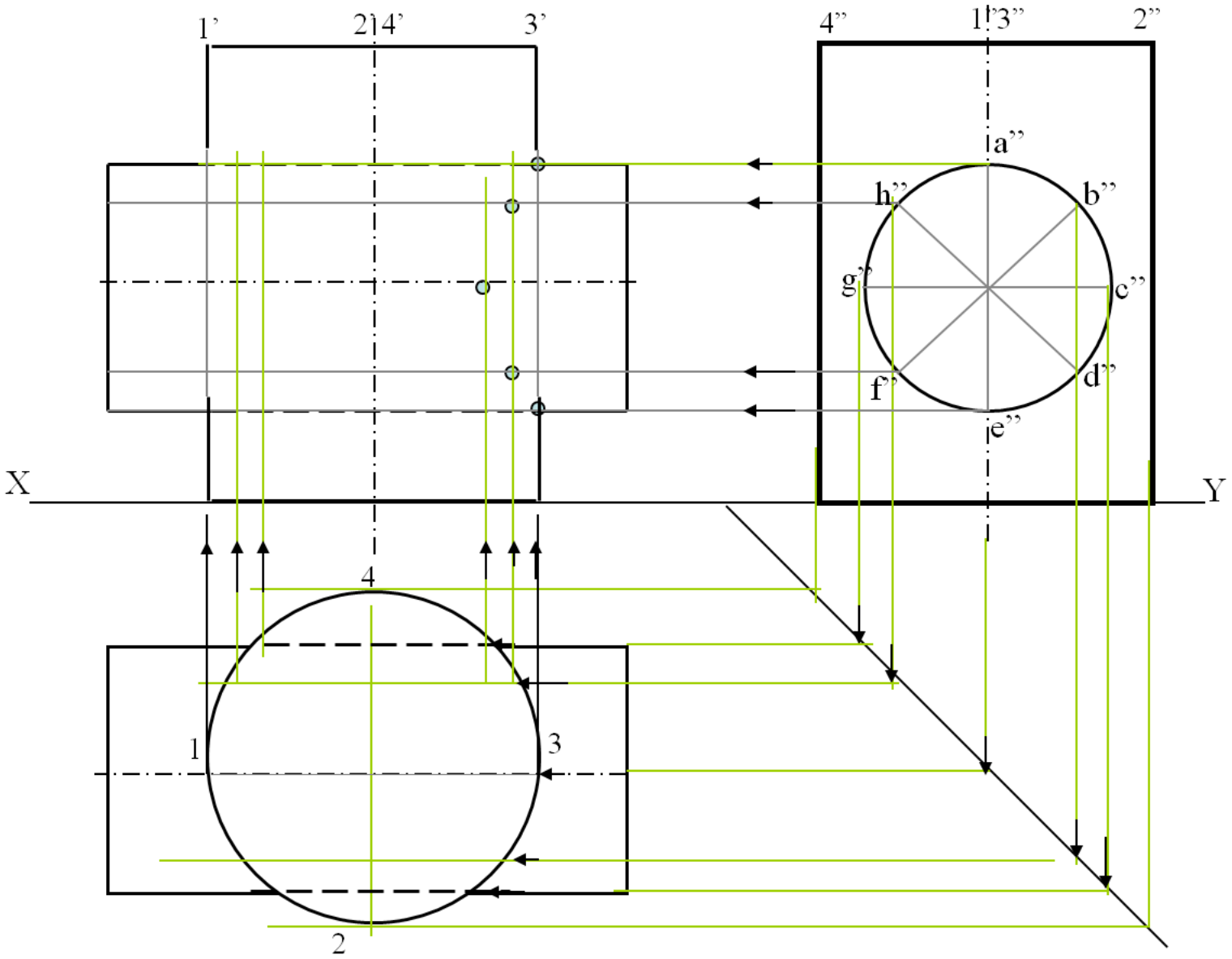
Problem: A cylinder 50mm dia. and 70mm axis is completely penetrated by another of 40 mm dia. and 70 mm axis horizontally Both axes intersect & bisect each other. Draw projections showing curves of intersections

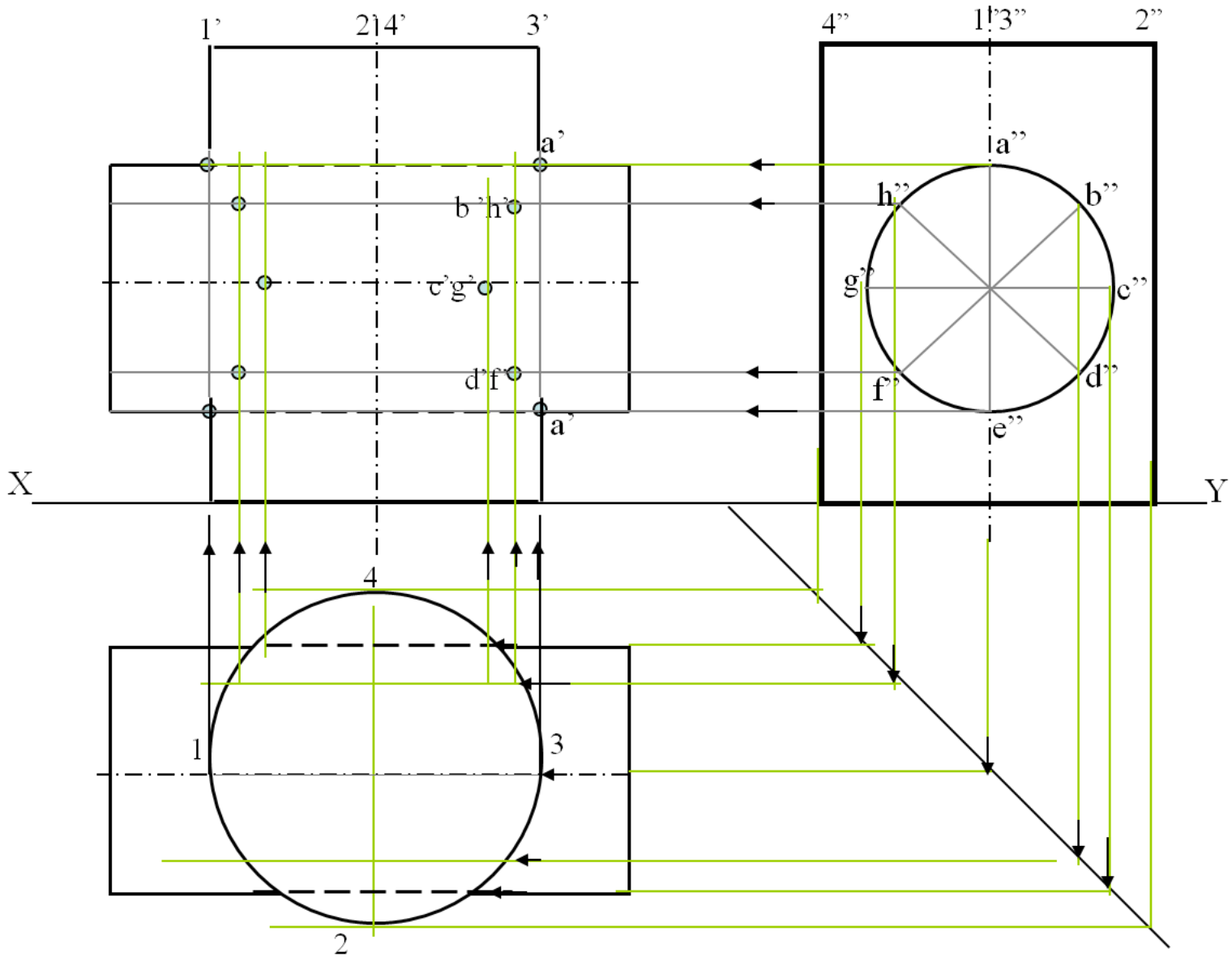


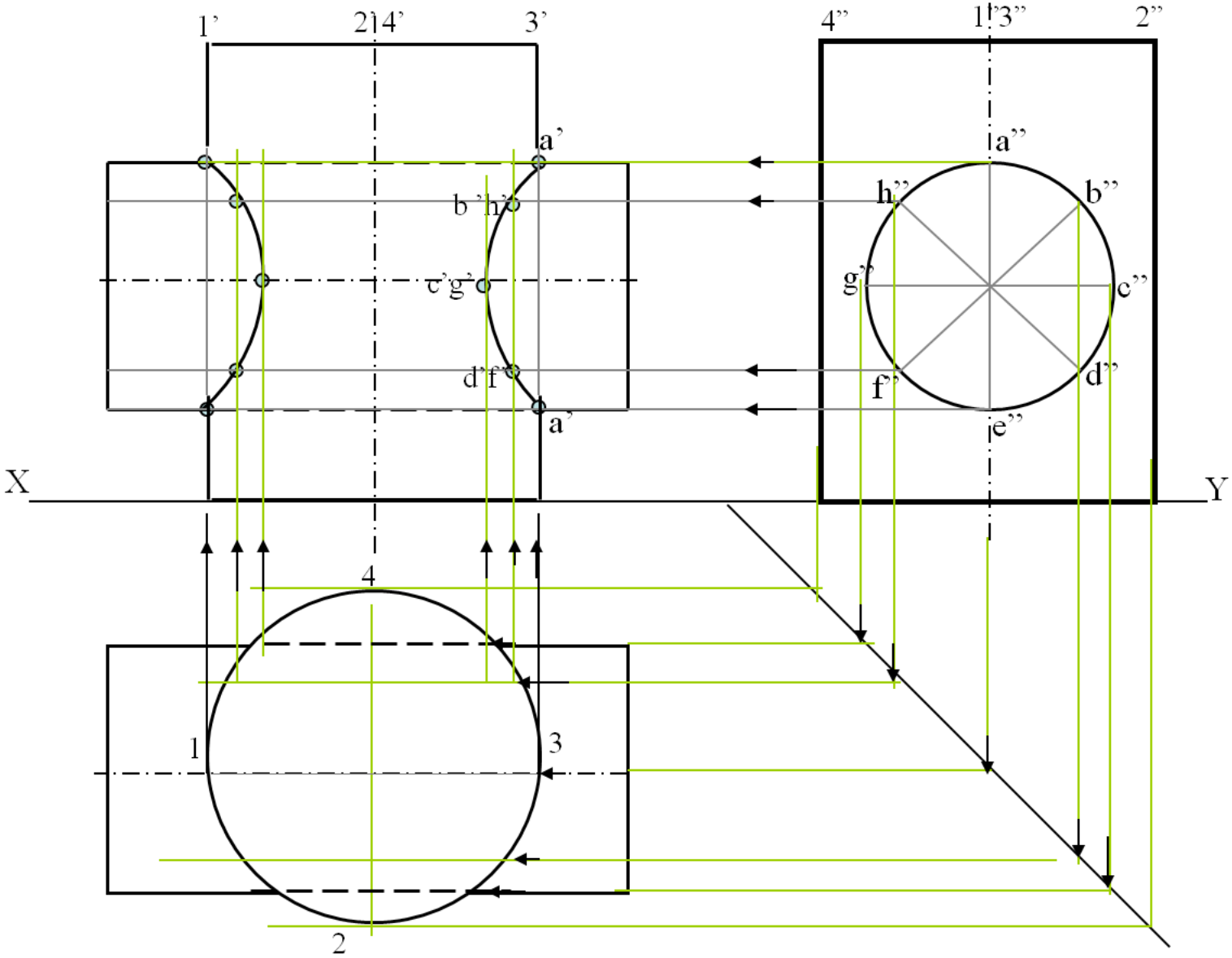

1’
2
4’
3’
4”
1
3”
2”
a”
h”
b”
g”
c”
f”
d”
e”
X
Y
4
1
3
2


1'
2'4'
3'
4"
1"3"
2"
a"
h"
b"
g"
c"
f"
d"
e"
X
Y
4
1
3
2


1'
2'4'
3'
4"
1"3"
2"
a"
h"
b"
g"
c"
f"
d"
e"
X
Y
4
1
3
2

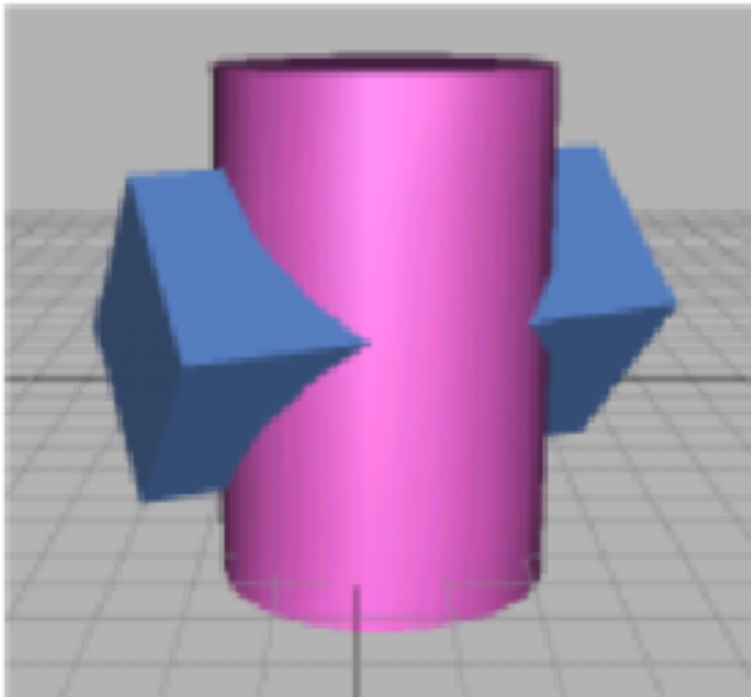

1’
2
4’
3’
4”
1”
3”
2”
a”
h”
b”
g”
c”
f”
d”
e”
X
Y
4
1
3
2

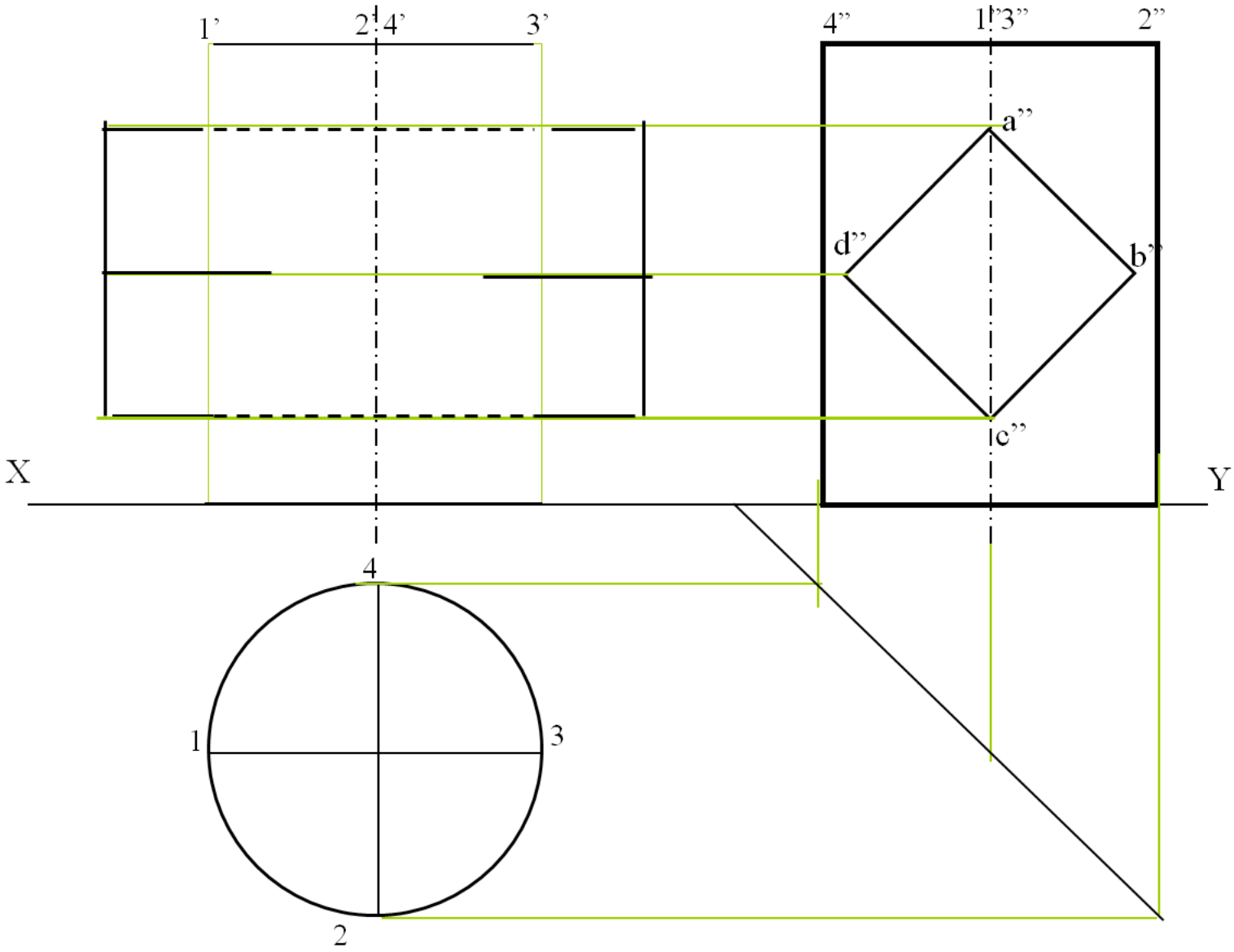

1’
2
4’
3’
a’
b’h’
c’g’
d’f’
a’
4”
1”
3”
2”
a”
h”
b”
g”
c”
f”
d”
e”
X
Y
4
1
3
2

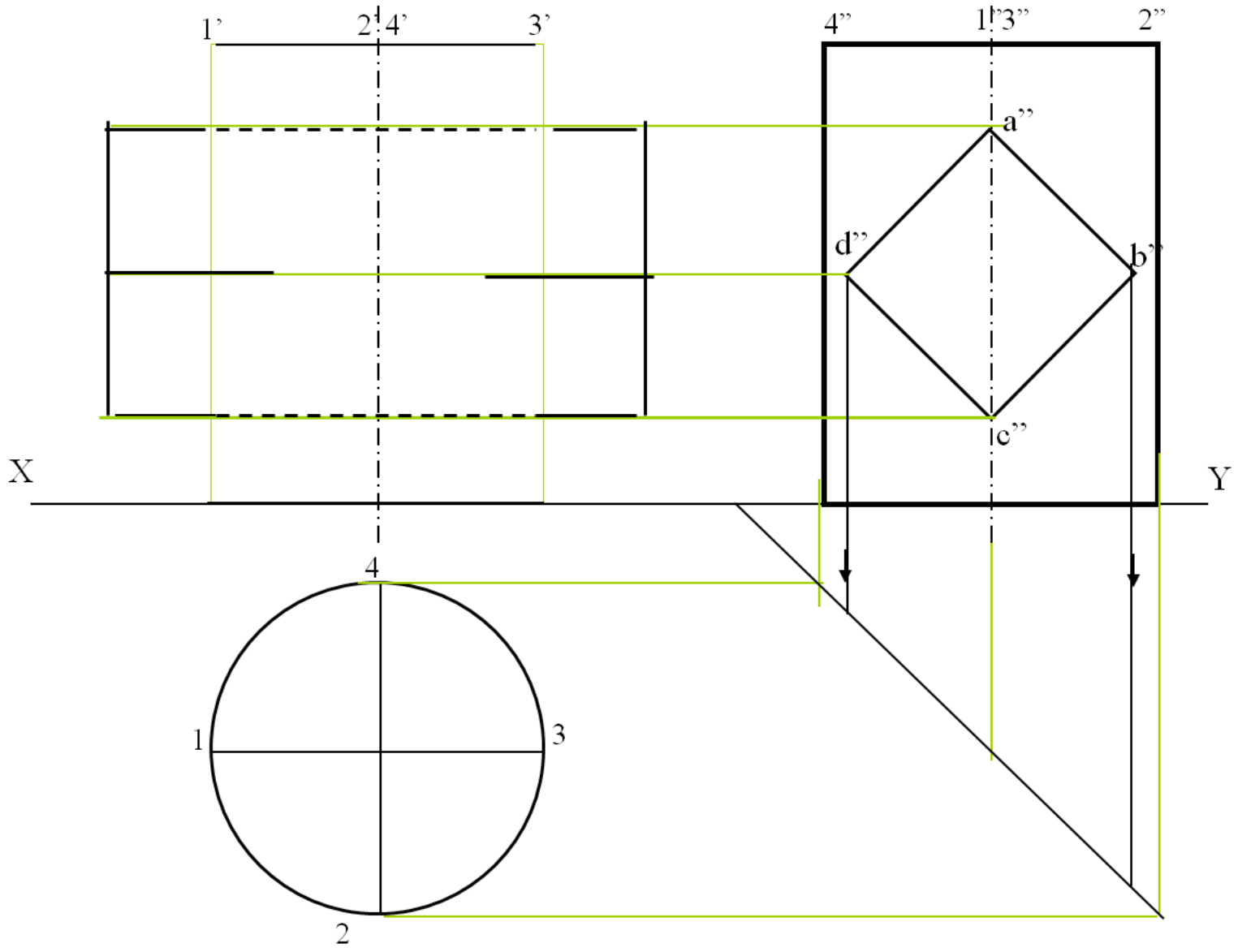

1'
2'4'
3'
a'
b' h'
c' g' d'
f'
a'
4"
1"3"
2"
a"
h"
b"
g"
c"
f"
d"
e"
X
Y
4
1
3
2

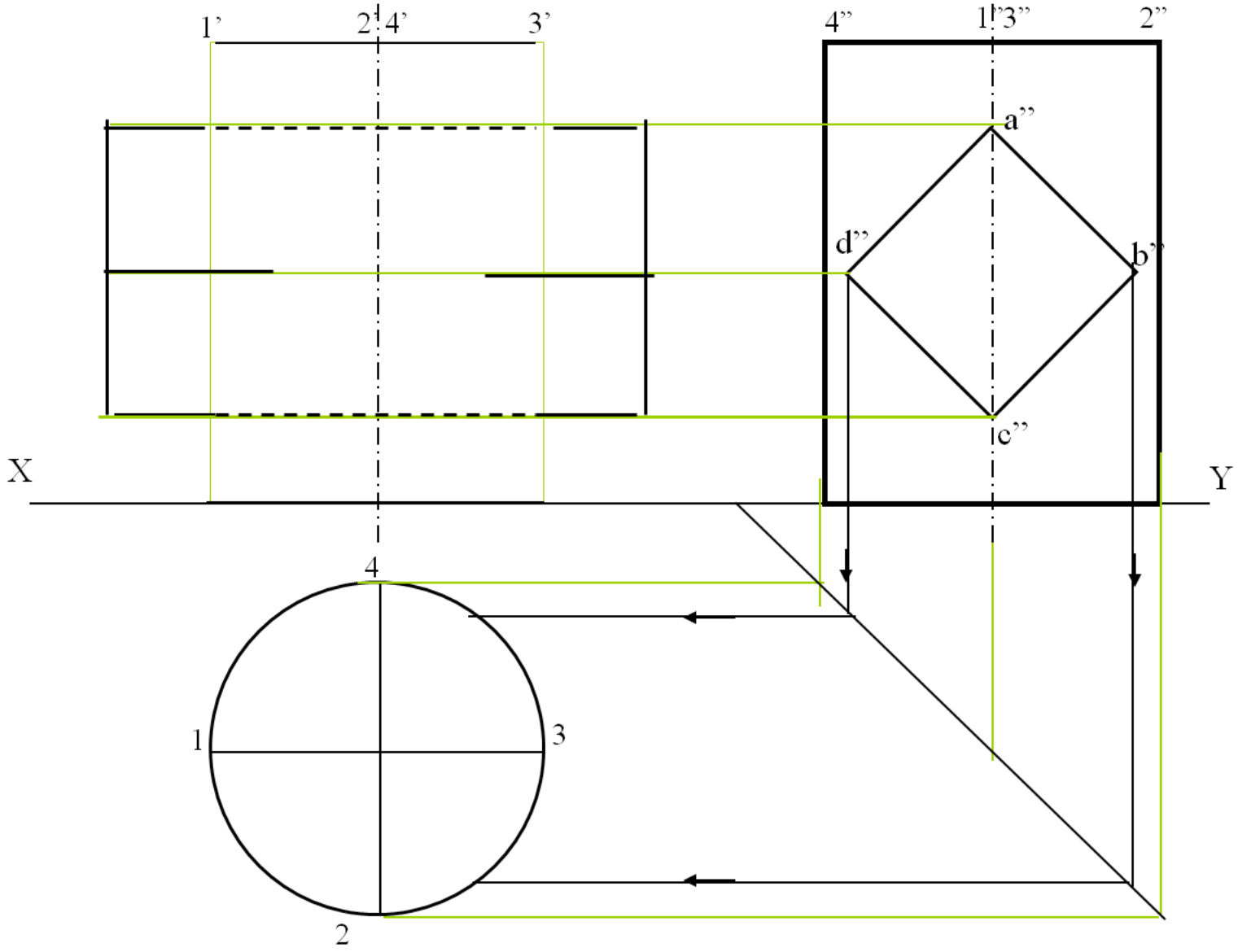
CYLINDER STANDING & SQ.PRISM PENETRATING

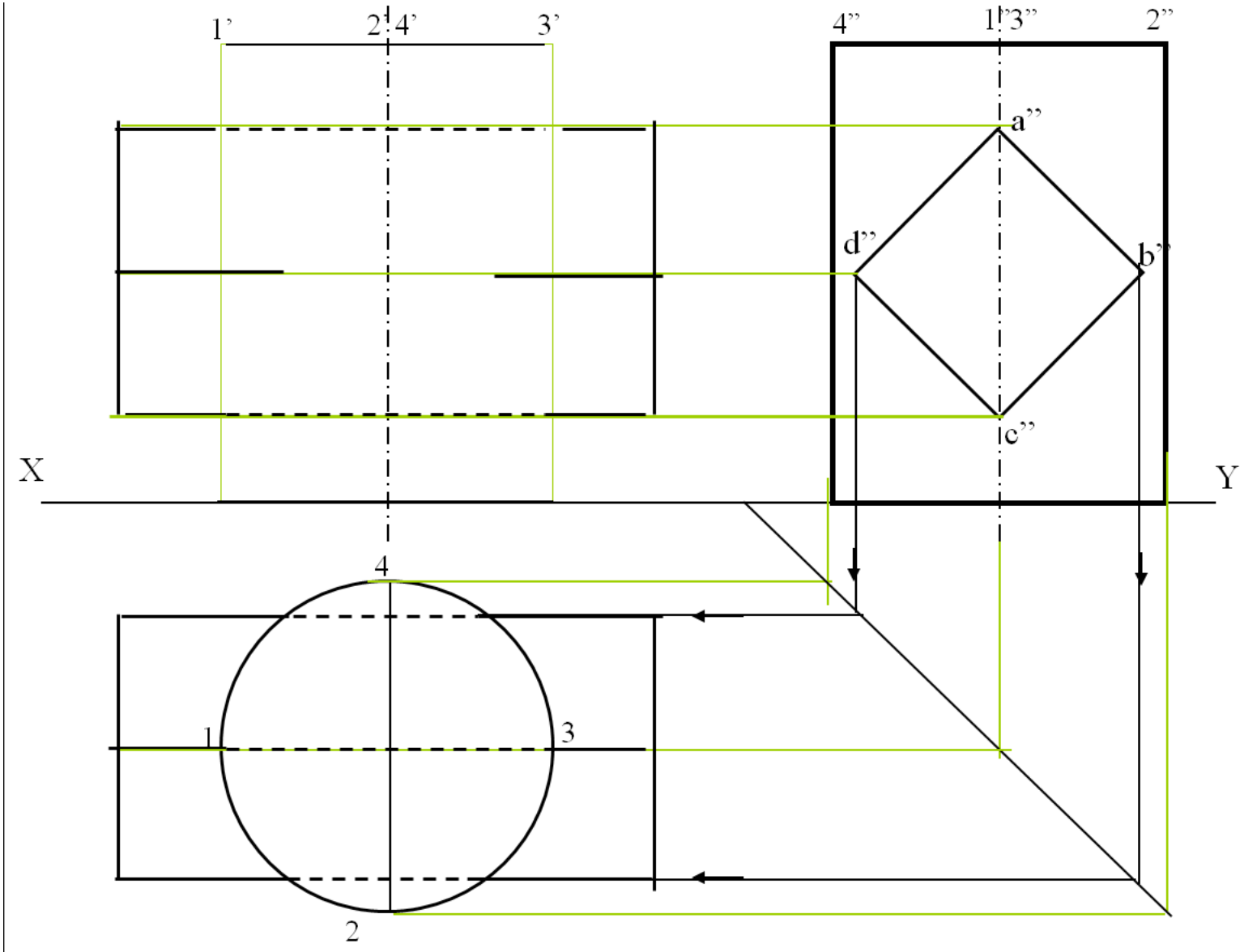
Problem: A cylinder 50mm dia.and 70mm axis is completely penetrated by a square prism of 25 mm sides.and 70 mm axis, horizontally. Both axes. Intersect & bisect each other. All faces of prism are equally inclined to Hp. Draw projections showing curves of intersections.

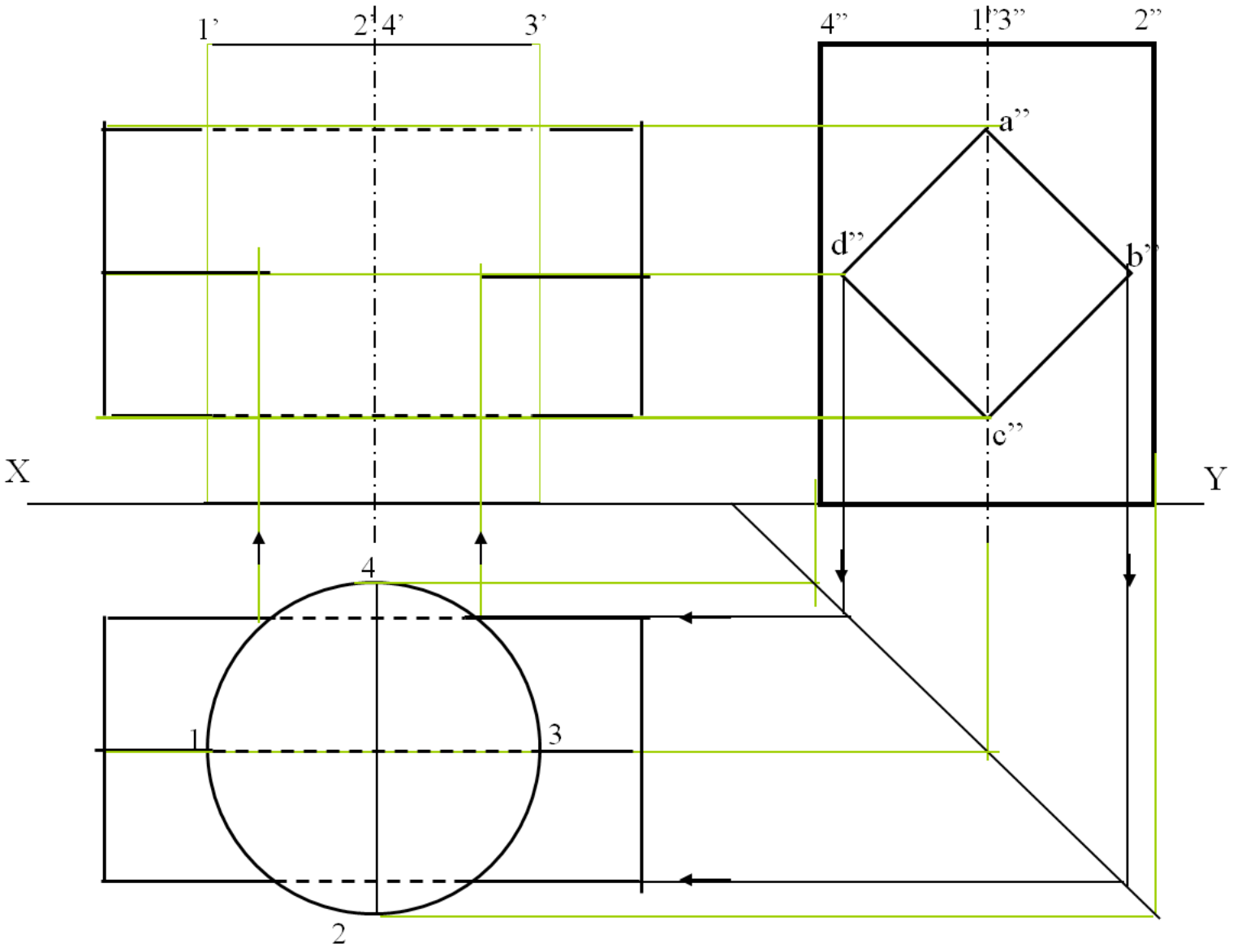


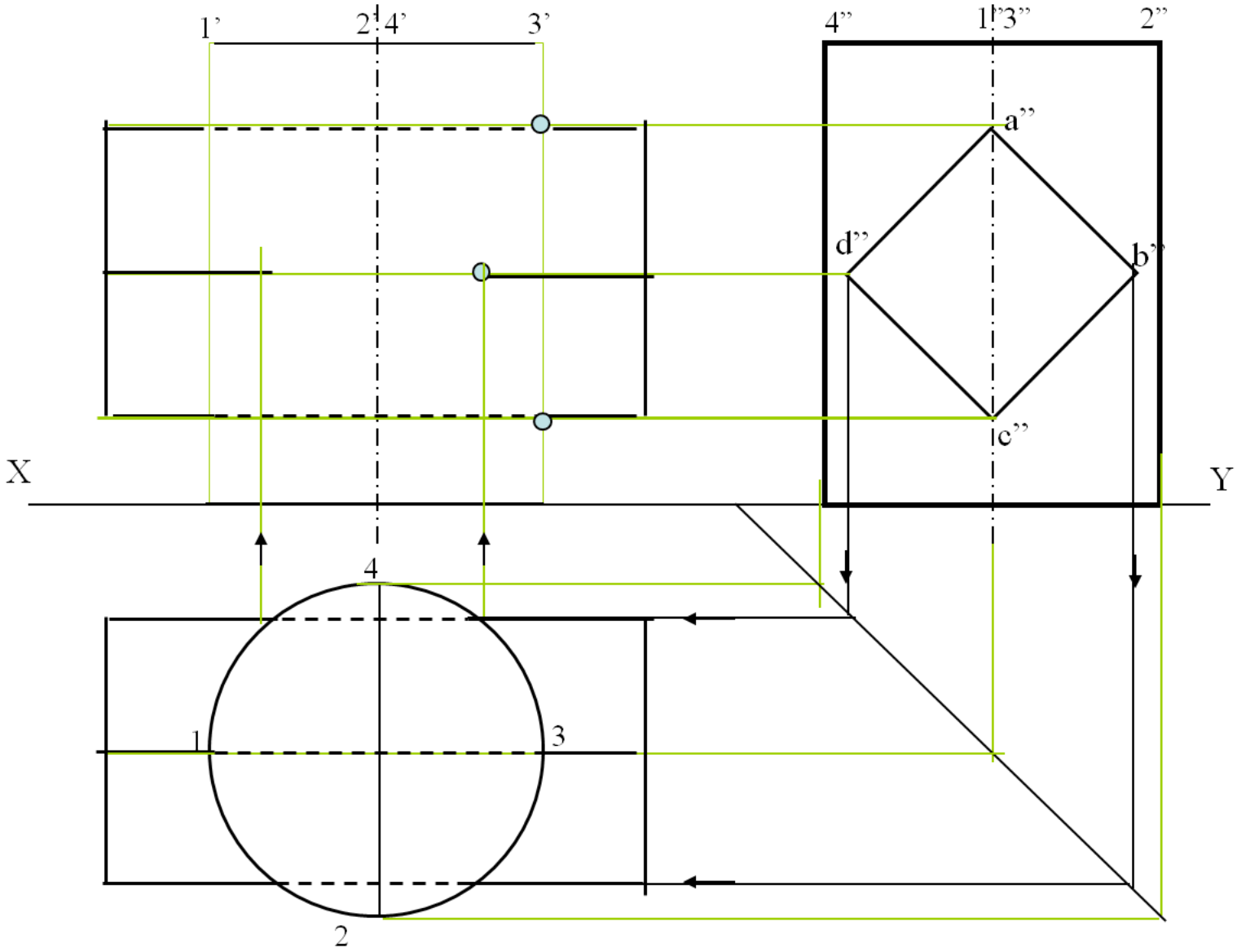

1’
2’4’
3’
4”
1”3”
2”
a”
d”
b”
c”
X
Y
4
1
3
2

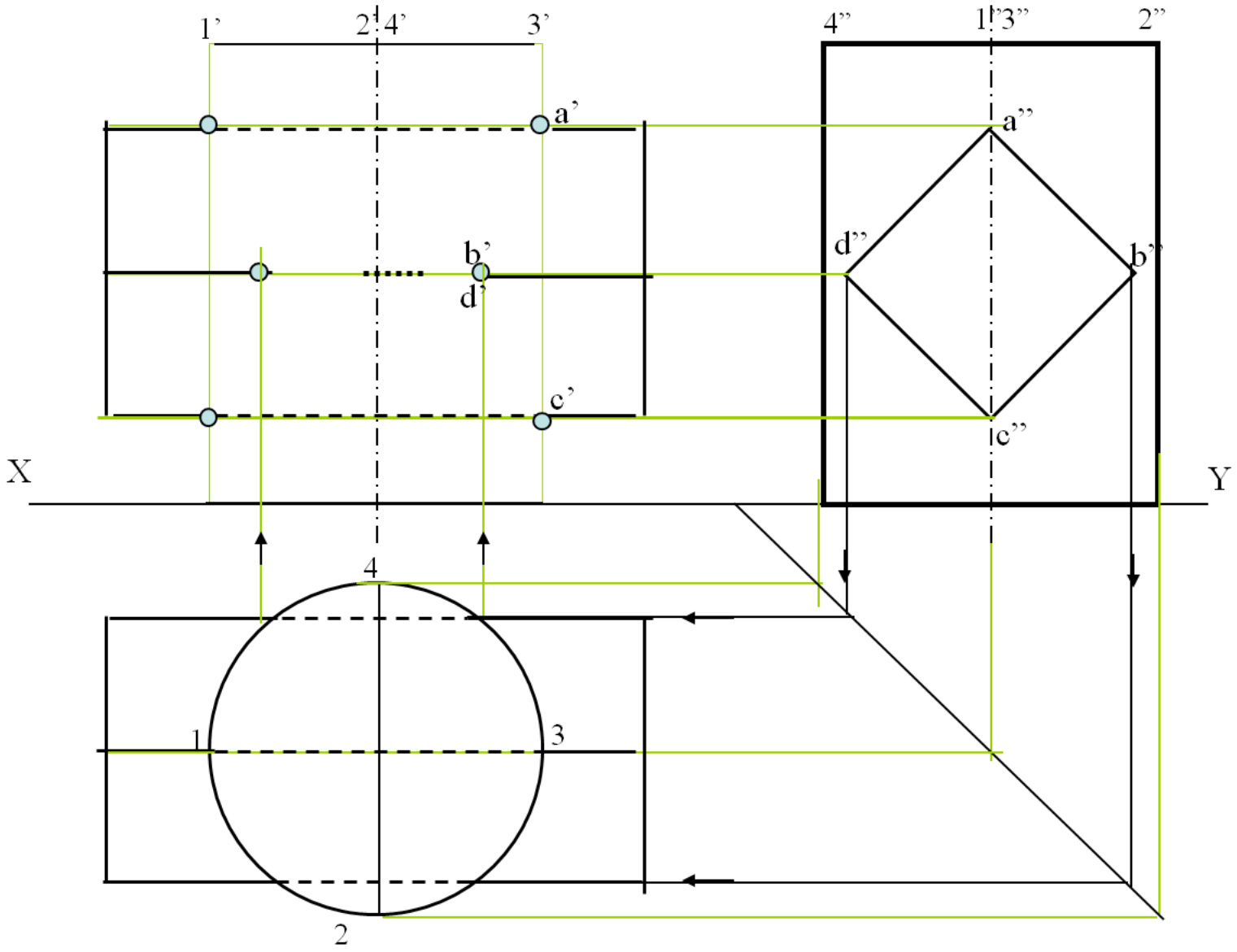

1’
2’ 4’
3’
4”
1” 3”
2”
a”
d”
b”
c”
X
Y
4
1
3
2

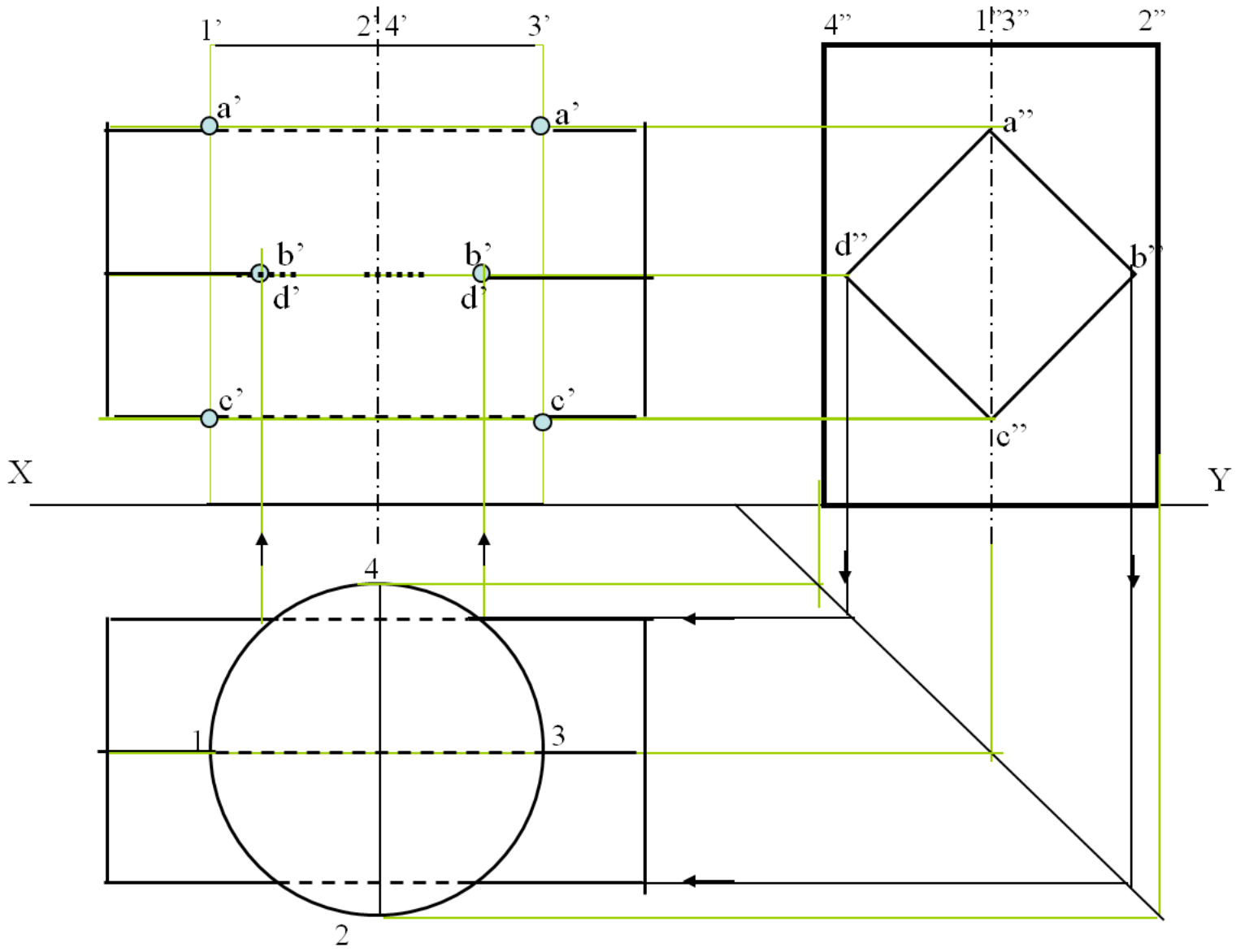

1’
2’ 4’
3’
4”
1” 3”
2”
a”
d”
b”
c”
X
Y
4
1
3
2

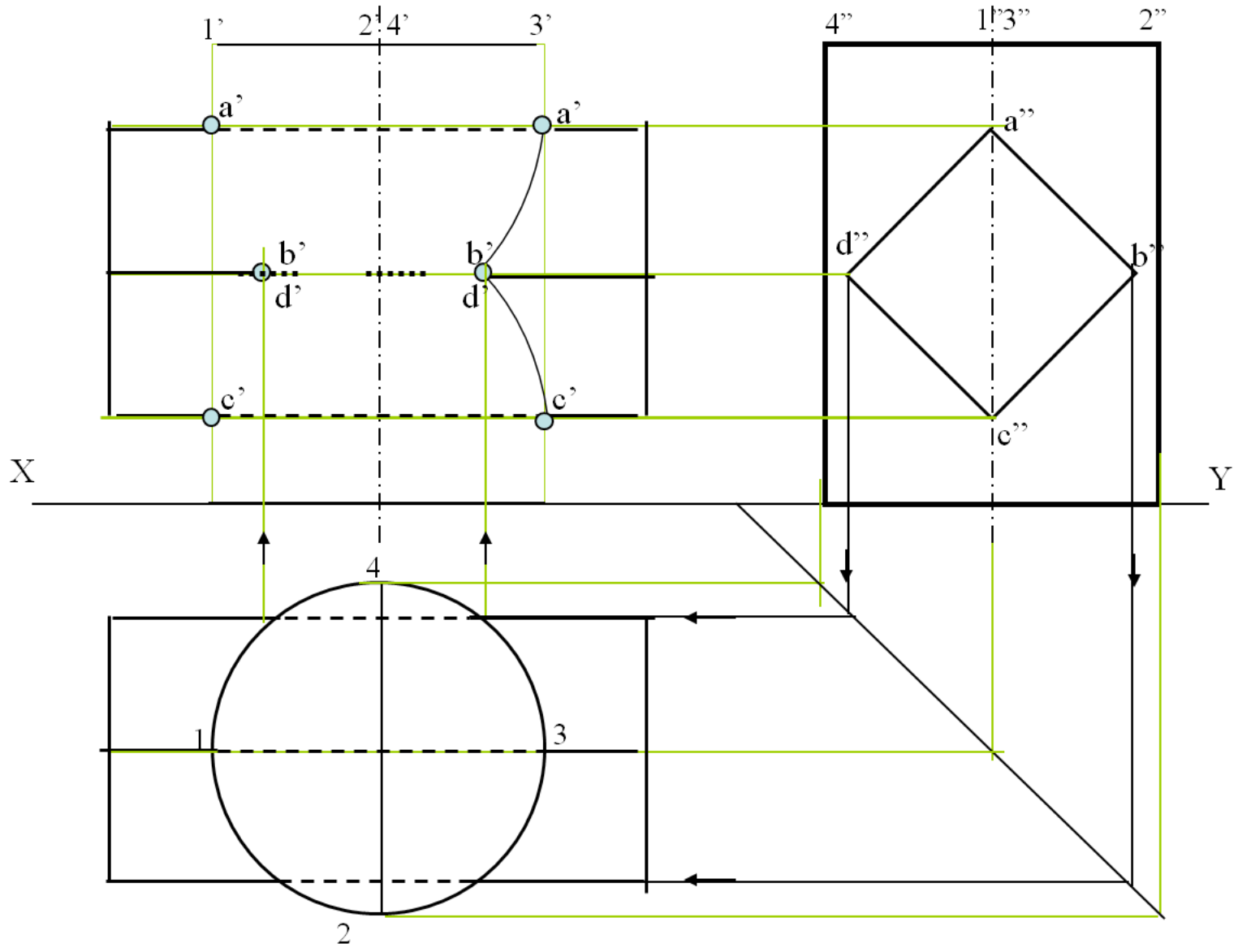

1'
2'4'
3'
4"
1"3"
2"
a"
d"
b"
c"
X
Y
4
1
3
2

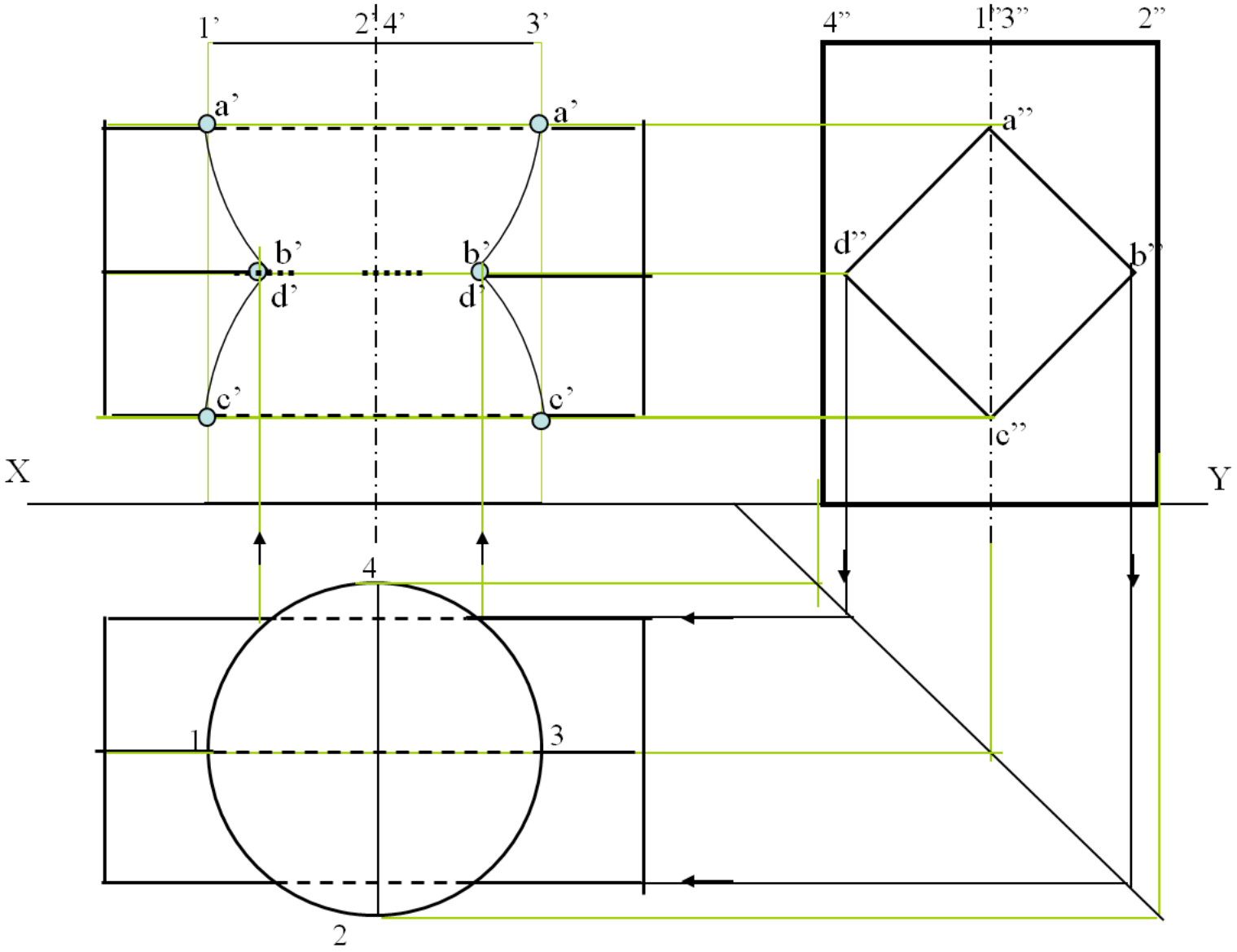

1’
2’ 4’
3’
4”
1” 3”
2”
a”
d”
b”
c”
X
Y
4
1
3
2

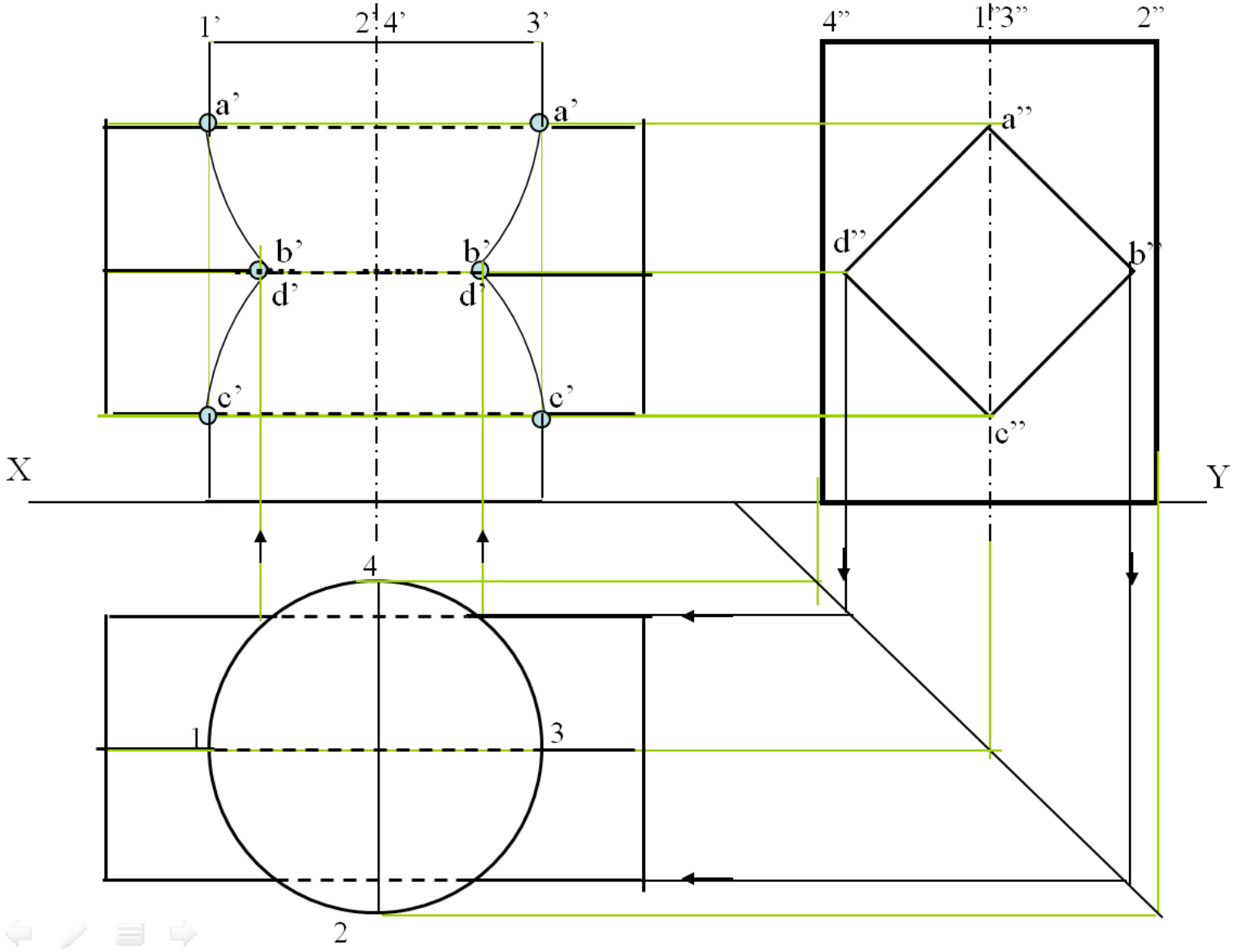

1’
2’4’
3’
4”
1”3”
2”
a”
d”
b”
c”
X
Y
4
1
3
2


1’
2’ 4’
3’
a’
b’
d’
c’
4”
1” 3”
2”
a”
d”
b”
c”
X
Y
4
1
3
2


1'
2'4'
3'
4"
1"3"
2"
a'
a'
a"
b'
b'
d'
d'
d"
b"
c'
c'
c"
X
Y
4
1
3
2

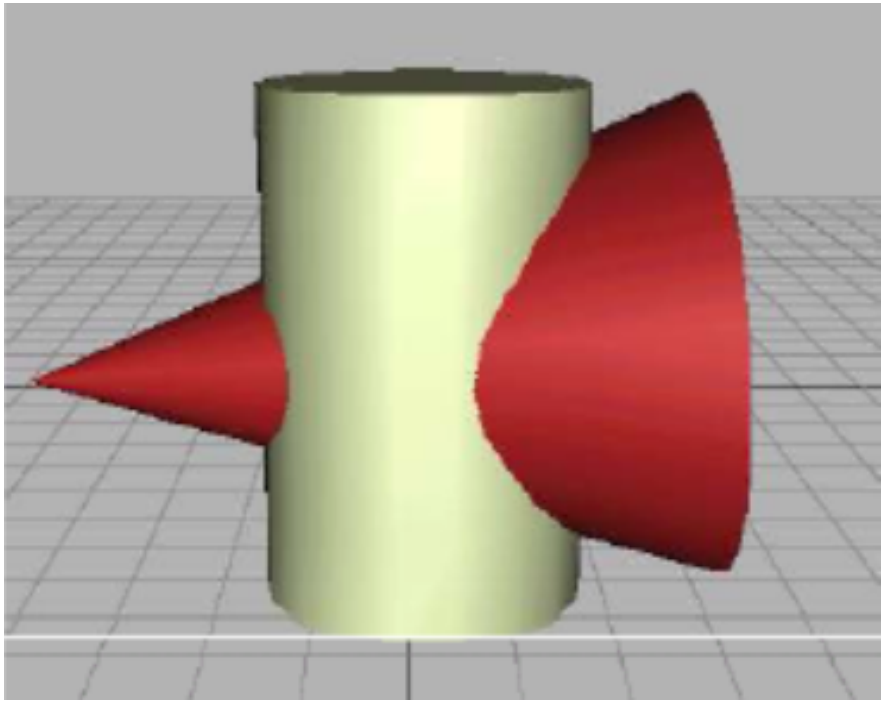

1'
2'
4'
3'
a'
a'
b'
b'
d'
d'
c'
c'
4"
1"
3"
2"
a"
d"
b"
c"
X
Y
4
1
3
2

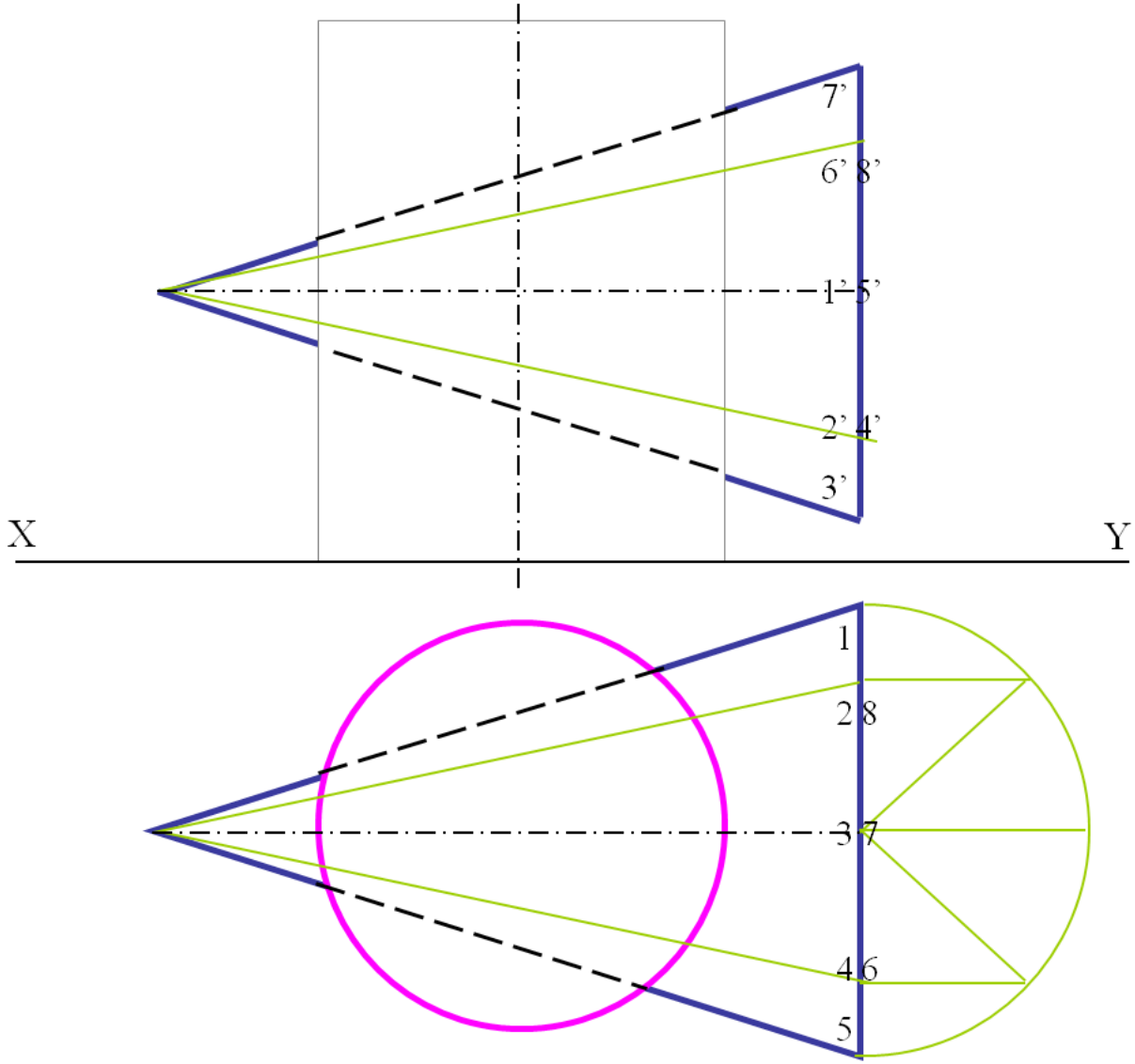

1'
2'4'
3'
4"
1"3"
2"
a'
a'
a"
b'
b'
d'
d'
d"
b"
c'
c'
c"
X
Y
4
1
3
2

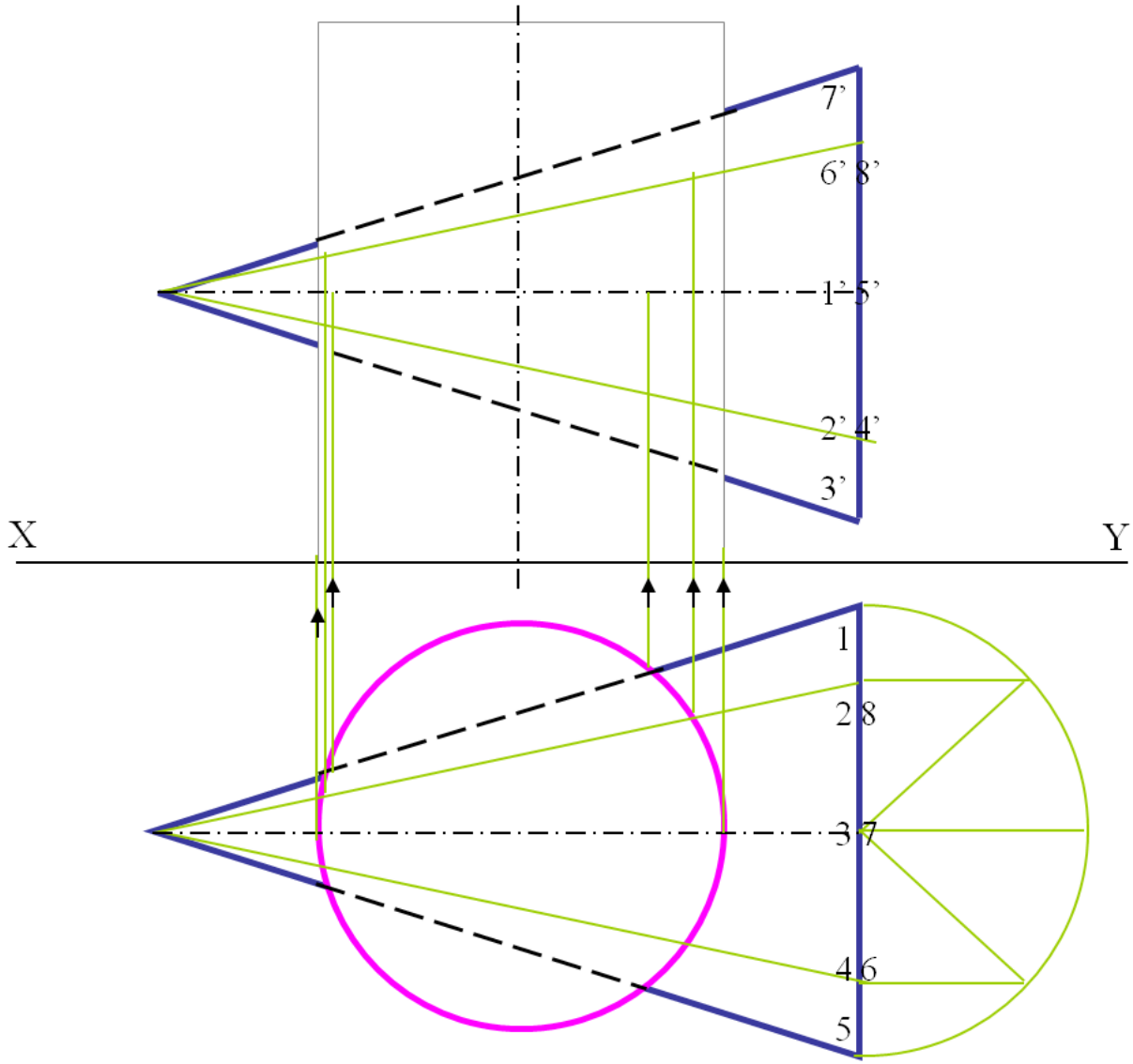

1’
2’4’
3’
a’
a’
b’
b’
d’
d’
c’
c’
4”
1”3”
2”
a”
d”
b”
c”
X
Y
4
1
3
2

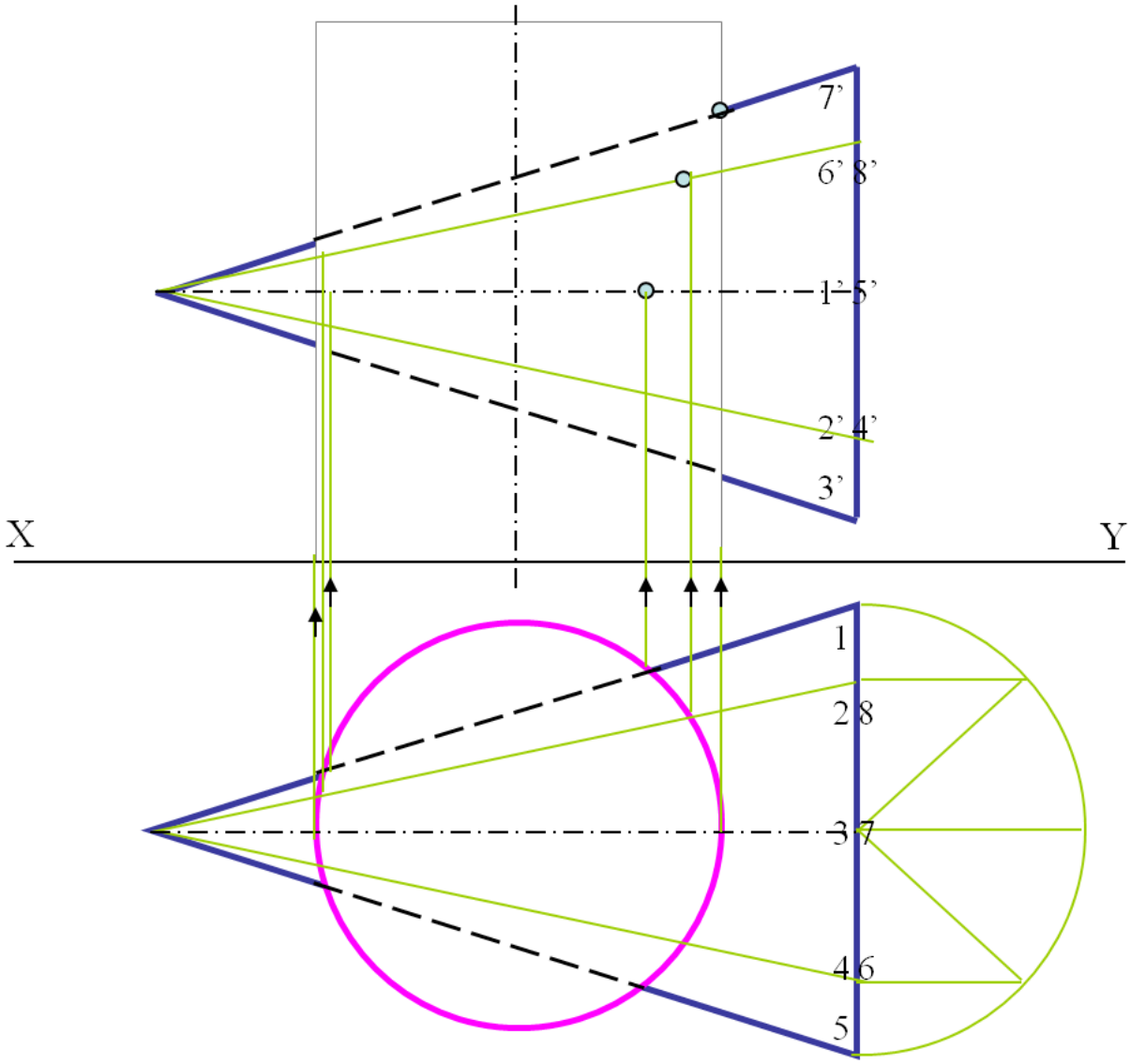
CYLINDER STANDING & CONE PENETRATING

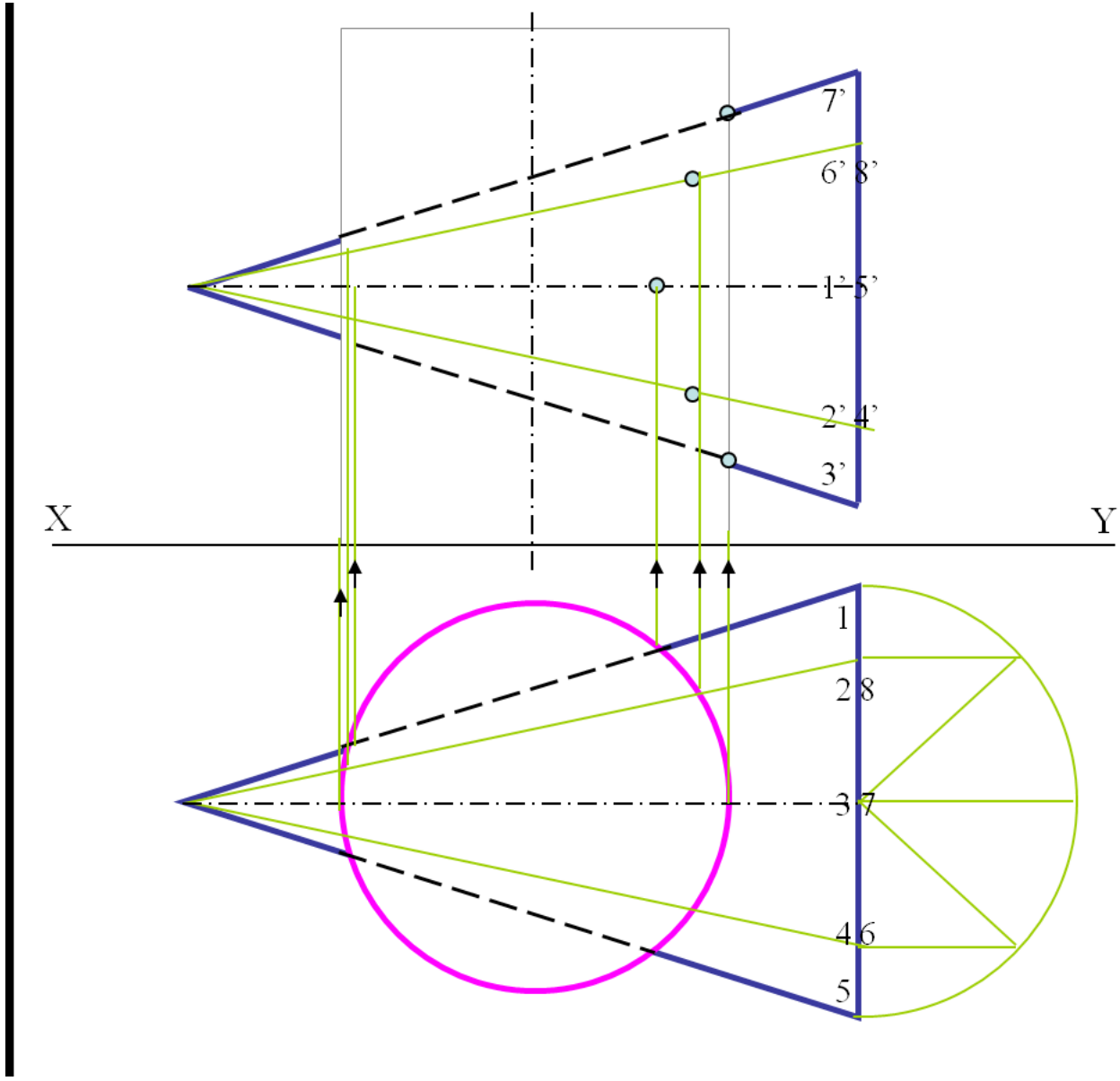
Problem: A cylinder of 80 mm diameter and 100 mm axis is completely penetrated by a cone of 80 mm diameter and 120 mm long axis horizontally.Both axes intersect & bisect each other. Draw projections showing curve of intersections.

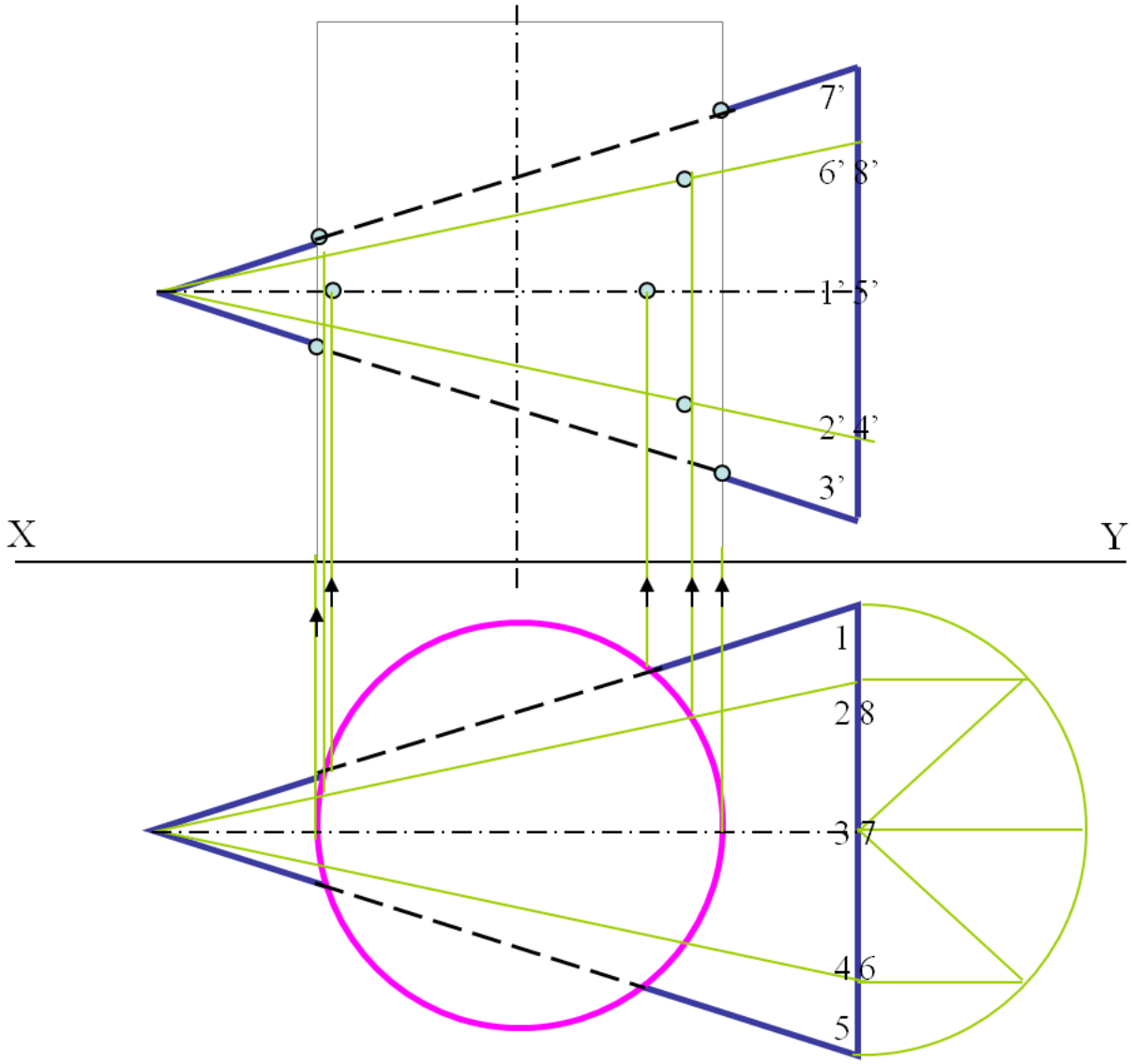


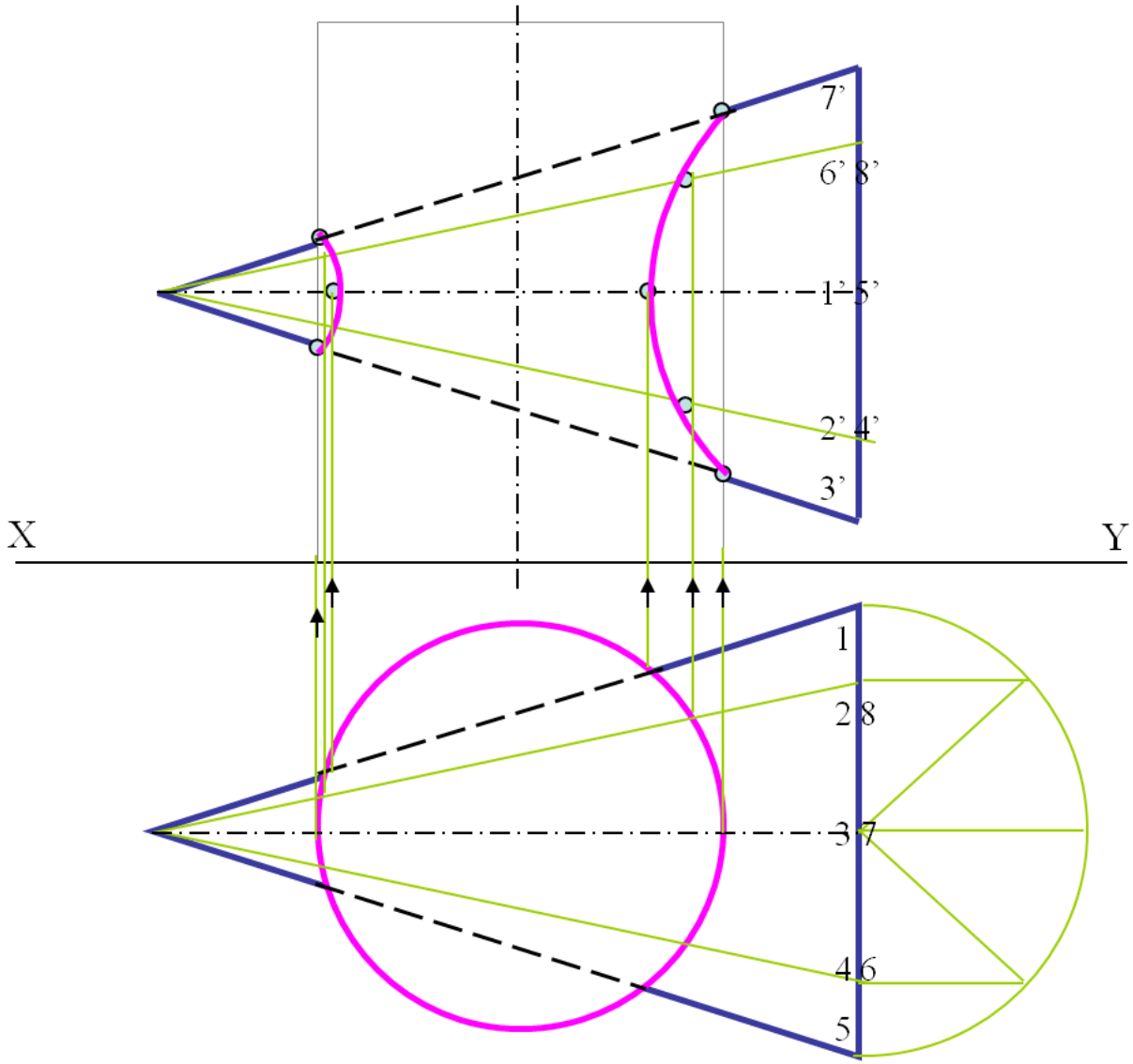

7’
6’ 8’
1’ 5’
2’ 4’
3’
X
Y
1
2 8
3 7
4 6
5

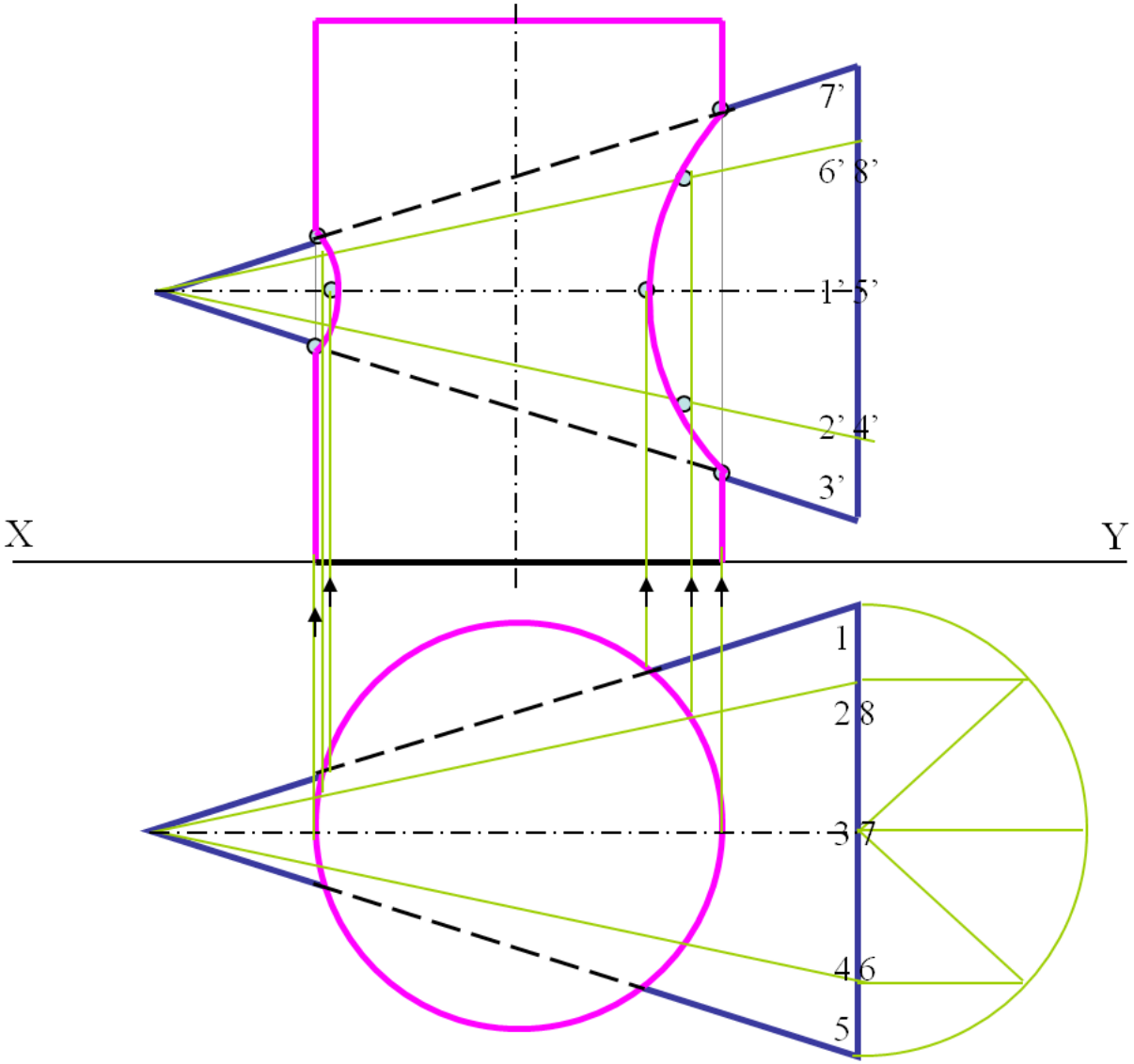

7’
6’ 8’
1’ 5’
2’ 4’
3’
X
Y
1
2 8
3 7
4 6
5

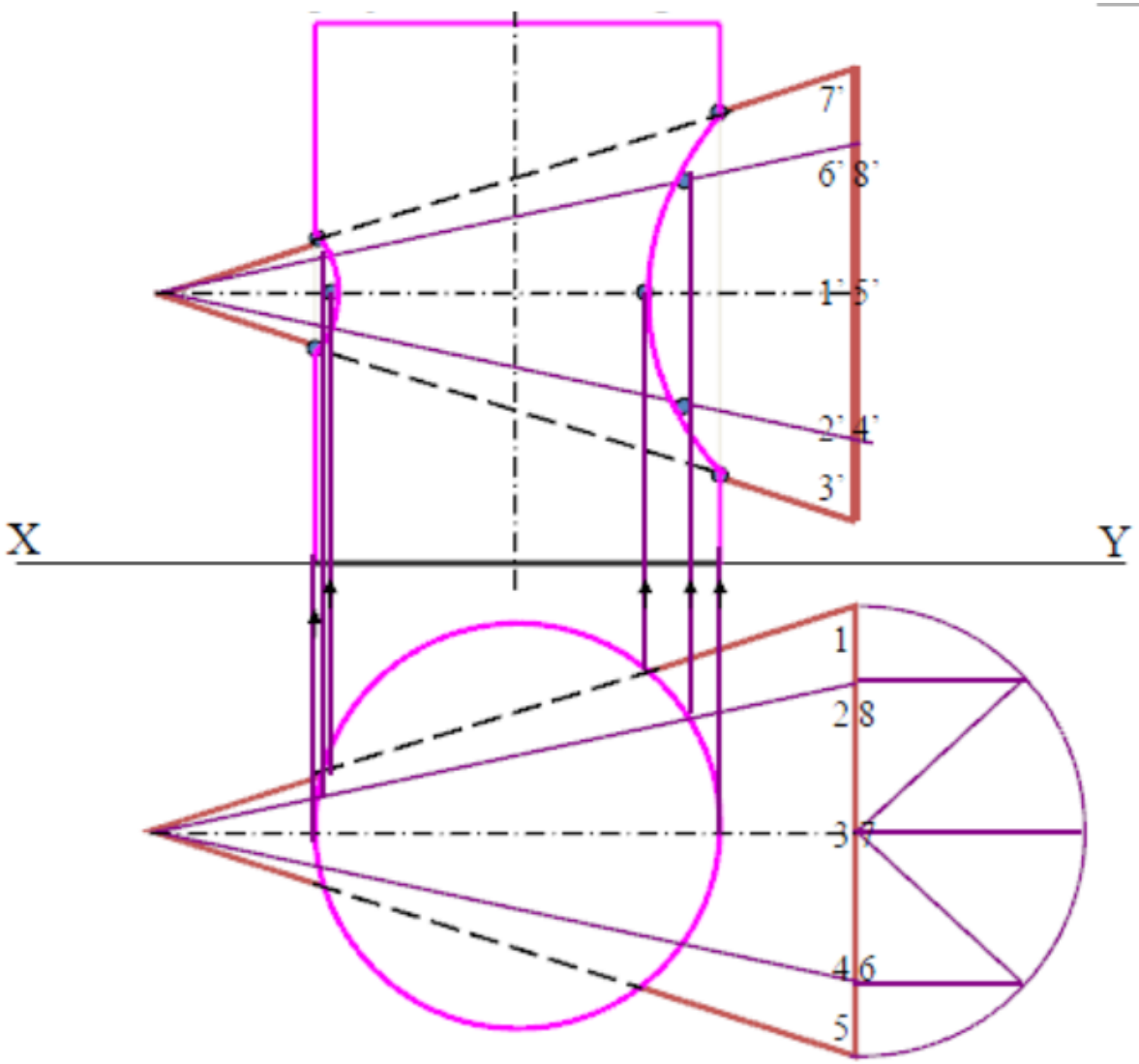

7’
6’ 8’
1’ 5’
2’ 4’
3’
X
Y
1
2 8
3 7
4 6
5


7’
6’ 8’
1’ 5’
2’ 4’
3’
X
Y
1
2 8
3 7
4 6
5


7’
6’ 8’
1’ 5’
2’ 4’
3’
X
Y
1
2 8
3 7
4 6
5

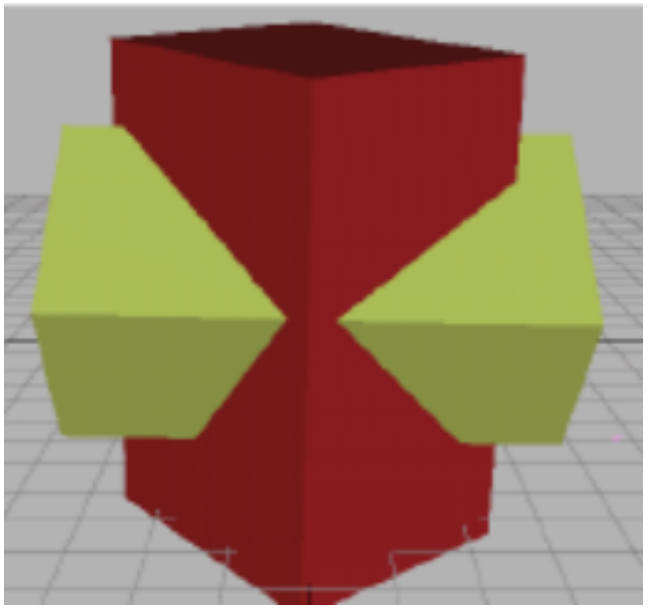

7’
6’ 8’
1’ 5’
2’ 4’
3’
X
Y
1
2 8
3 7
4 6
5

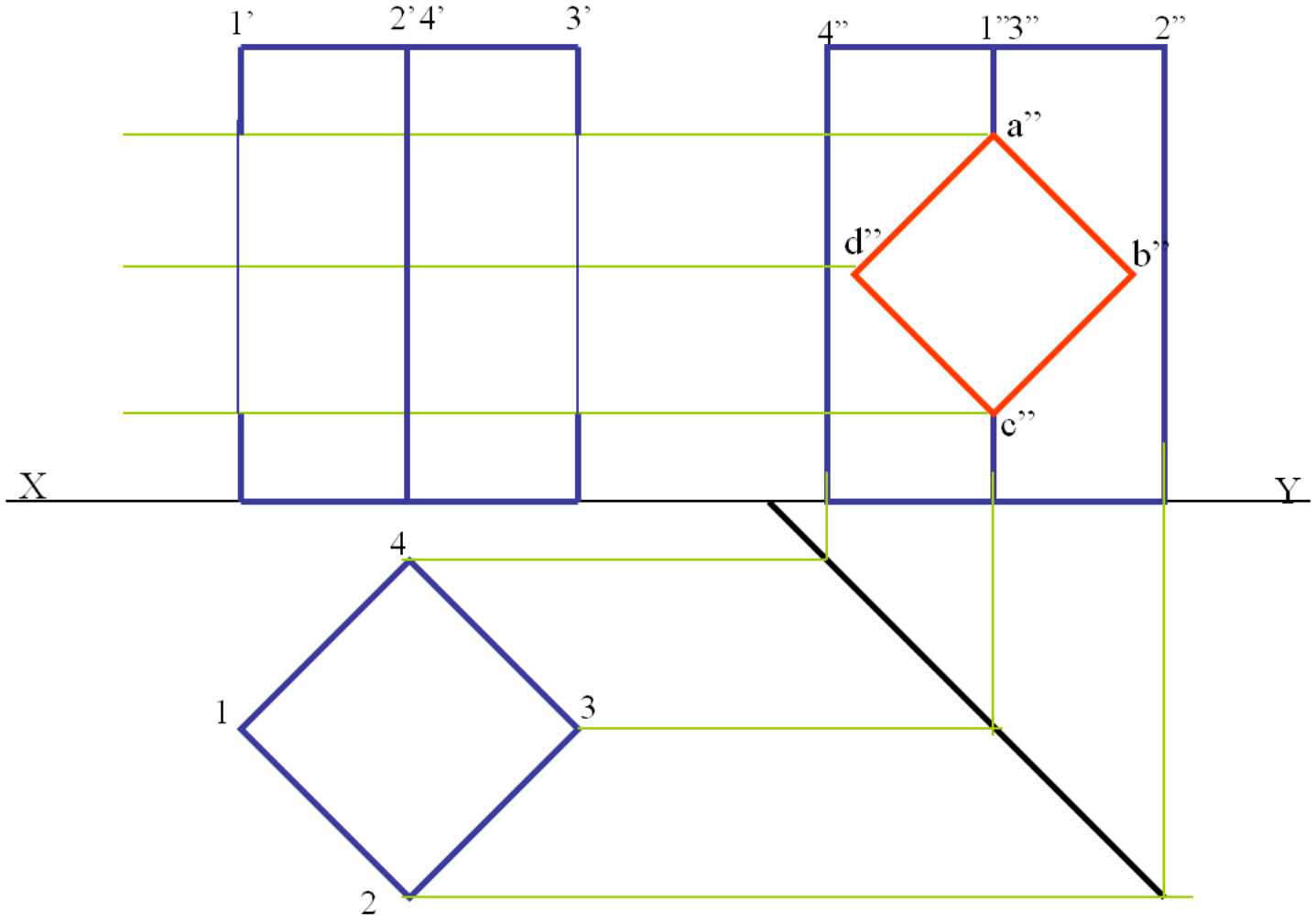

7’
6’ 8’
1’ 5’
2’ 4’
3’
X
Y
1
2 8
3 7
4 6
5

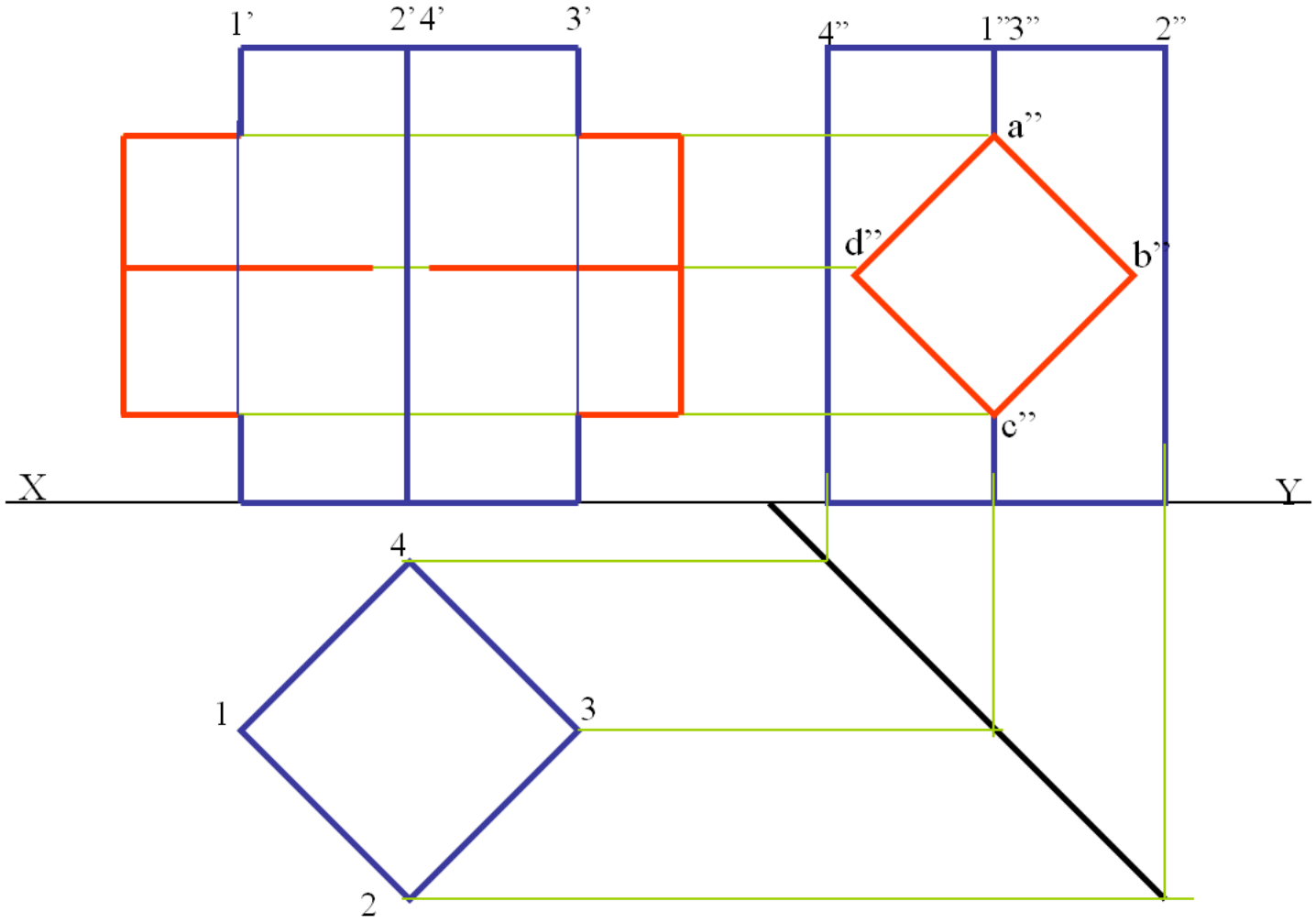

7`
6` 8`
1` 5`
2` 4`
3`
X
Y
1
2 8
3 7
4 6
5

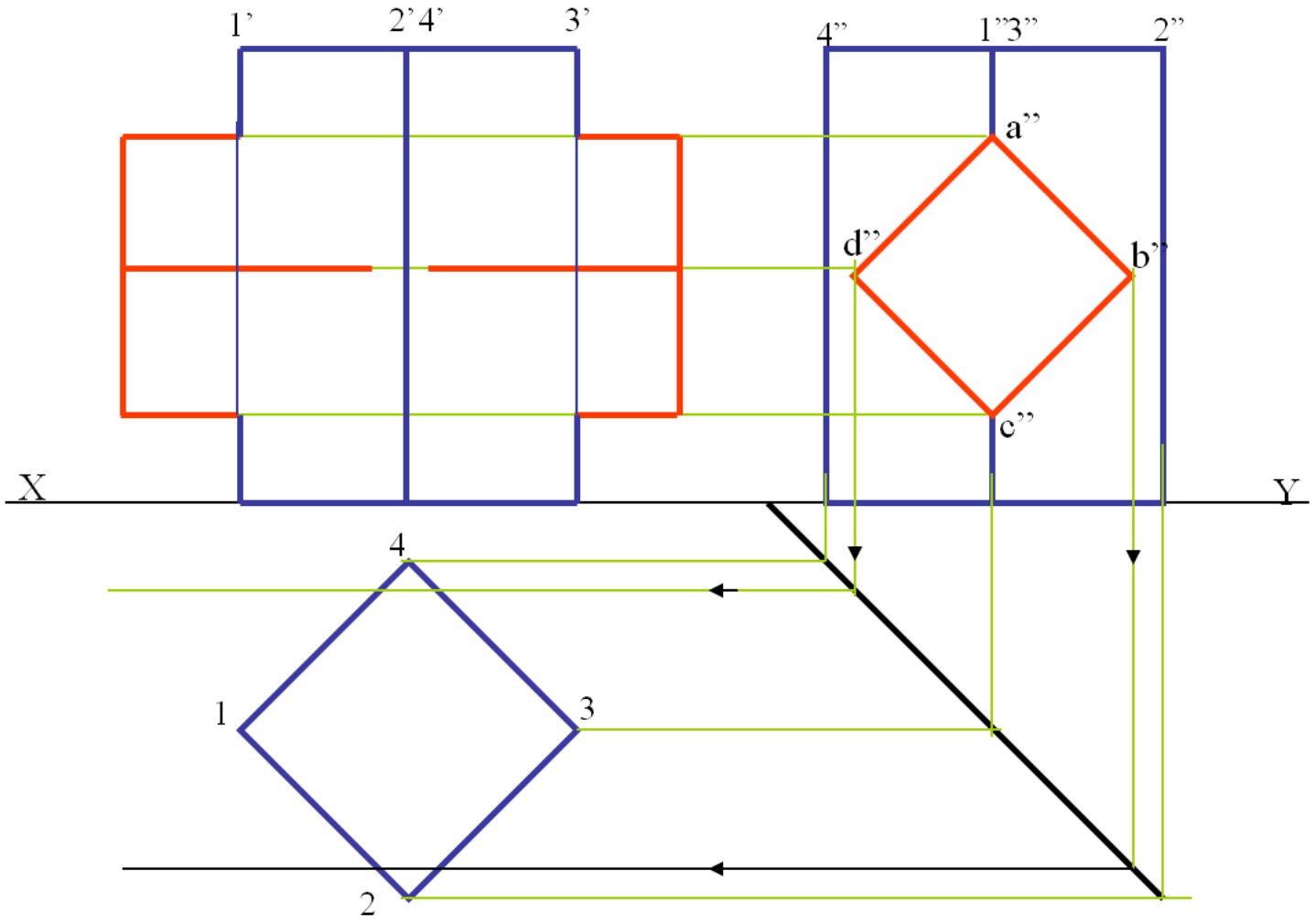
SQ.PRISM STANDING & SQ.PRISM PENETRATING

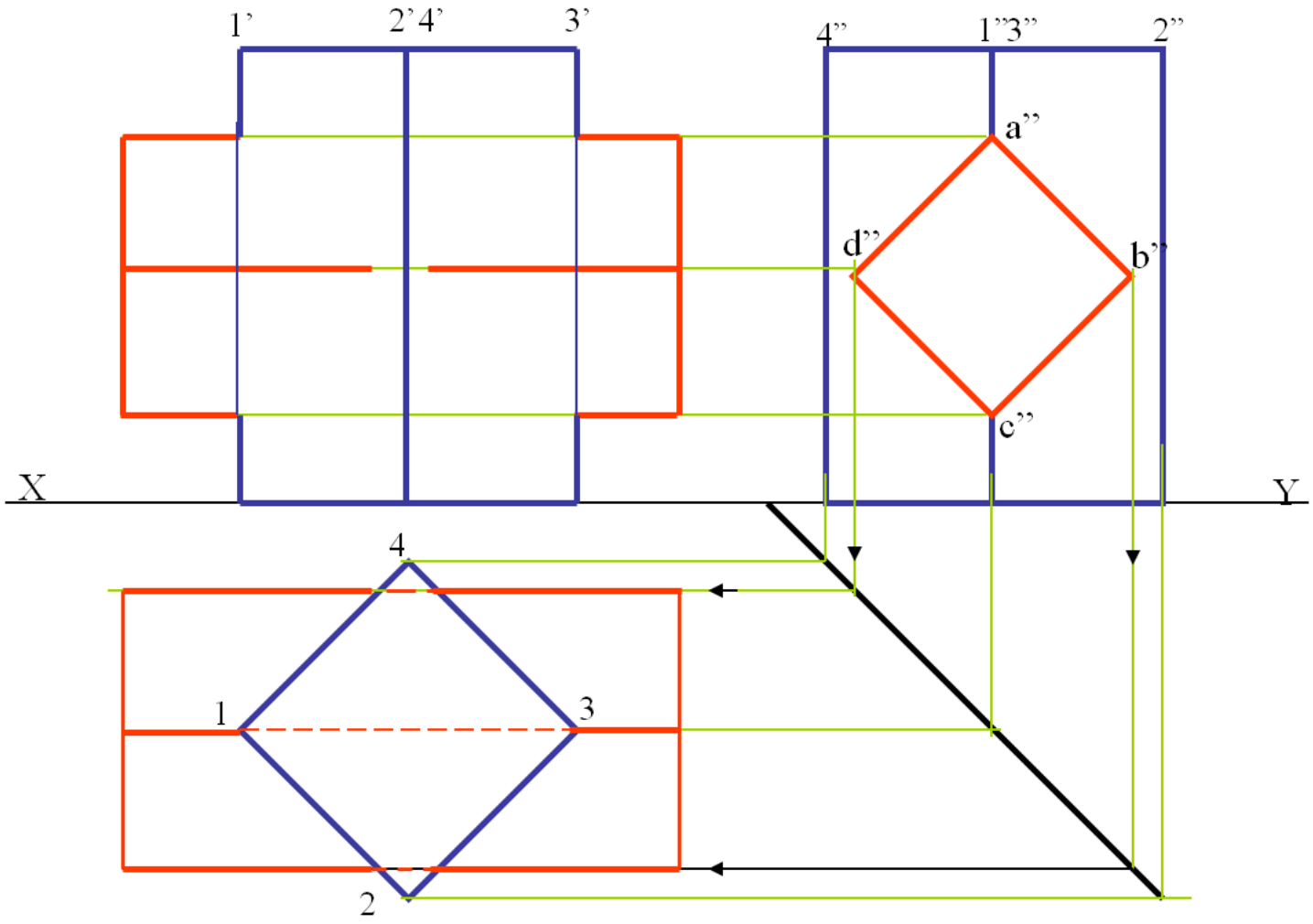
Problem: A sq. prism 30 mm base sides and 70mm axis is completely penetrated by another square prism of 25 mm sides and 70 mm axis, horizontally. Both axes Intersects & bisect each other. All faces of prisms are equally inclined to Vp. Draw projections showing curves of intersections.

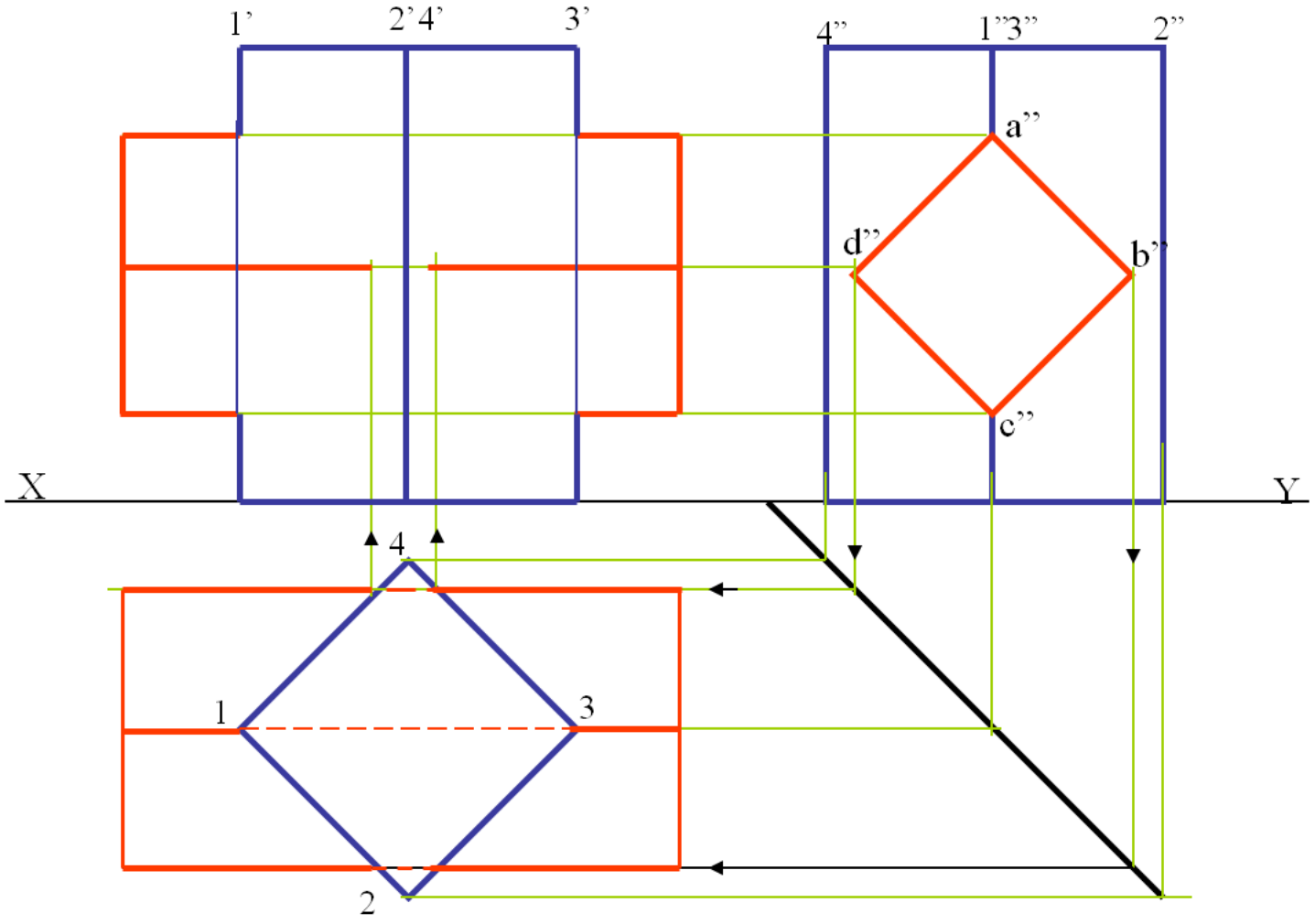


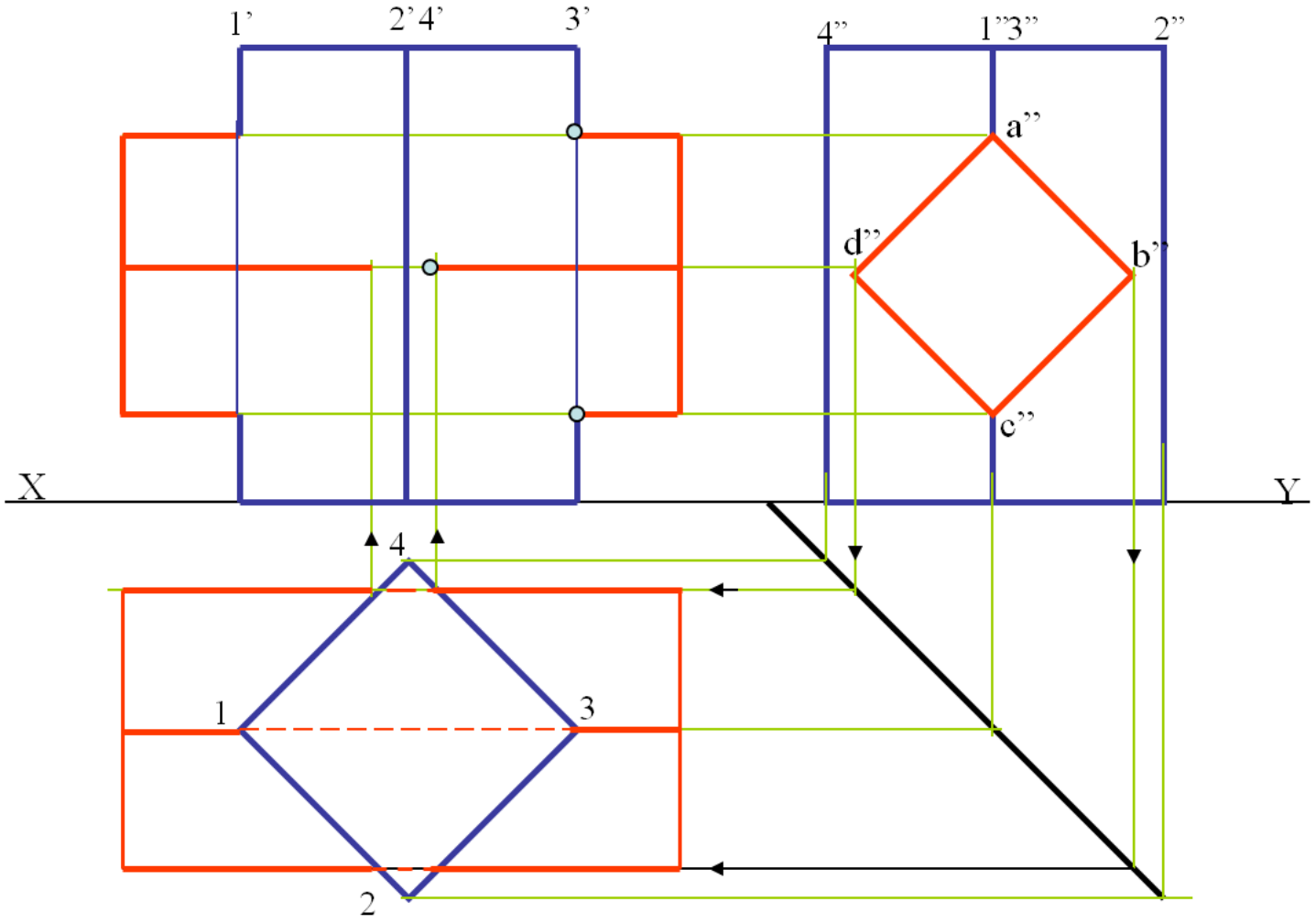

1'
2'4'
3'
4"
1"3"
2"
a"
d"
b"
c"
X
Y
4
1
3
2

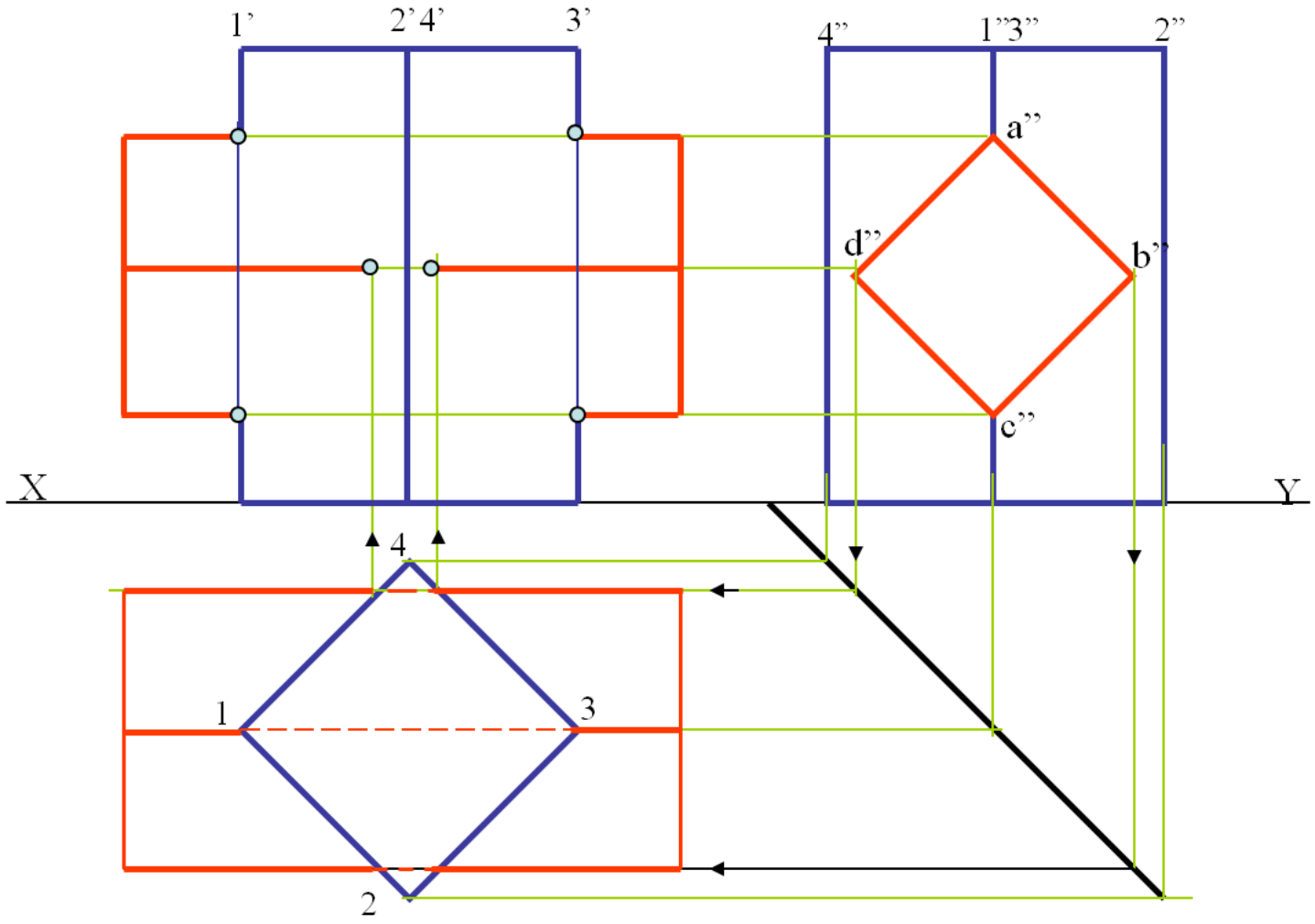

1’
2’4’
3’
4”
1”3”
2”
a”
d”
b”
c”
X
Y
4
1
3
2

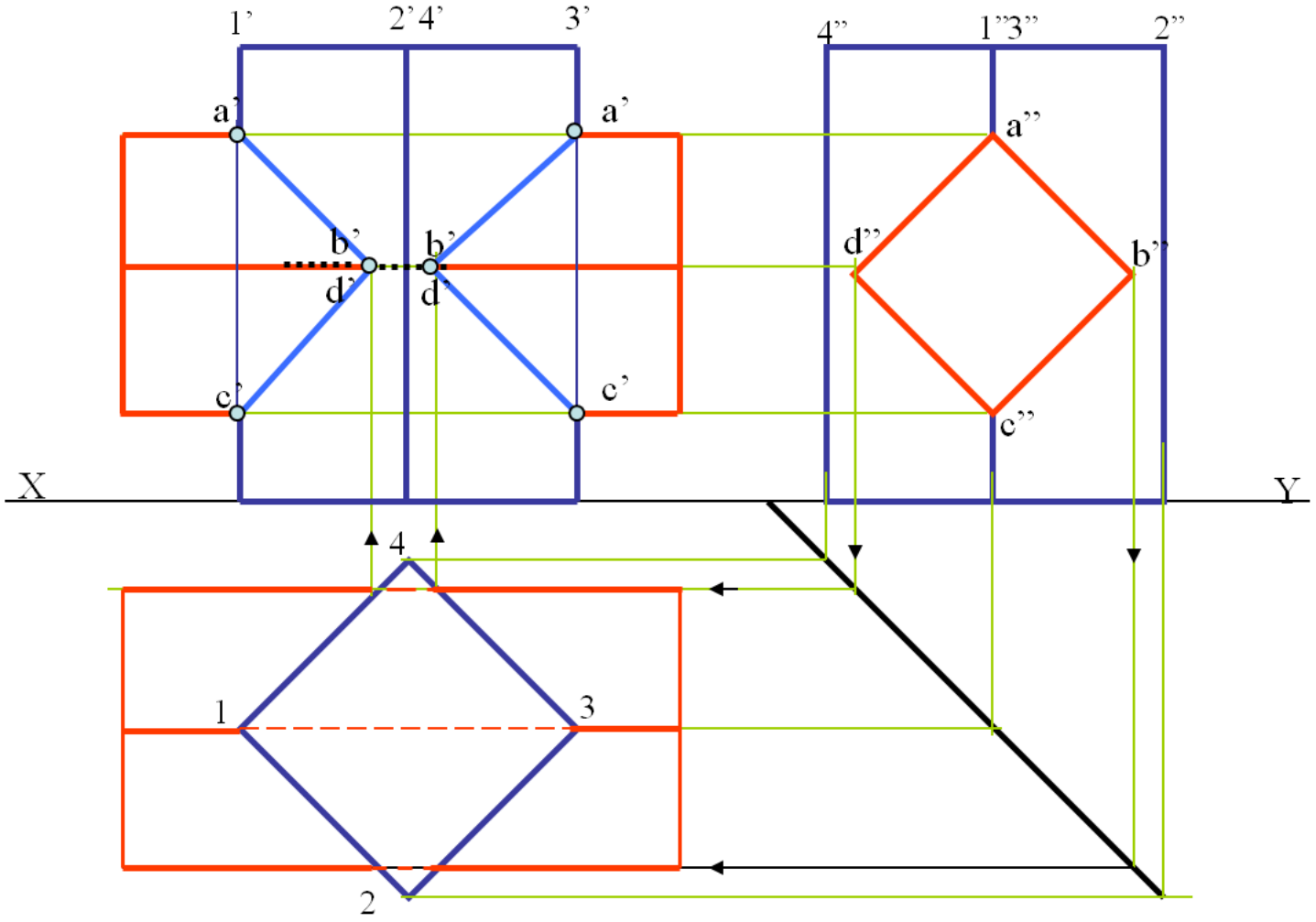

1’
2’ 4’
3’
4”
1”3”
2”
a”
d”
b”
c”
X
Y
4
1
3
2

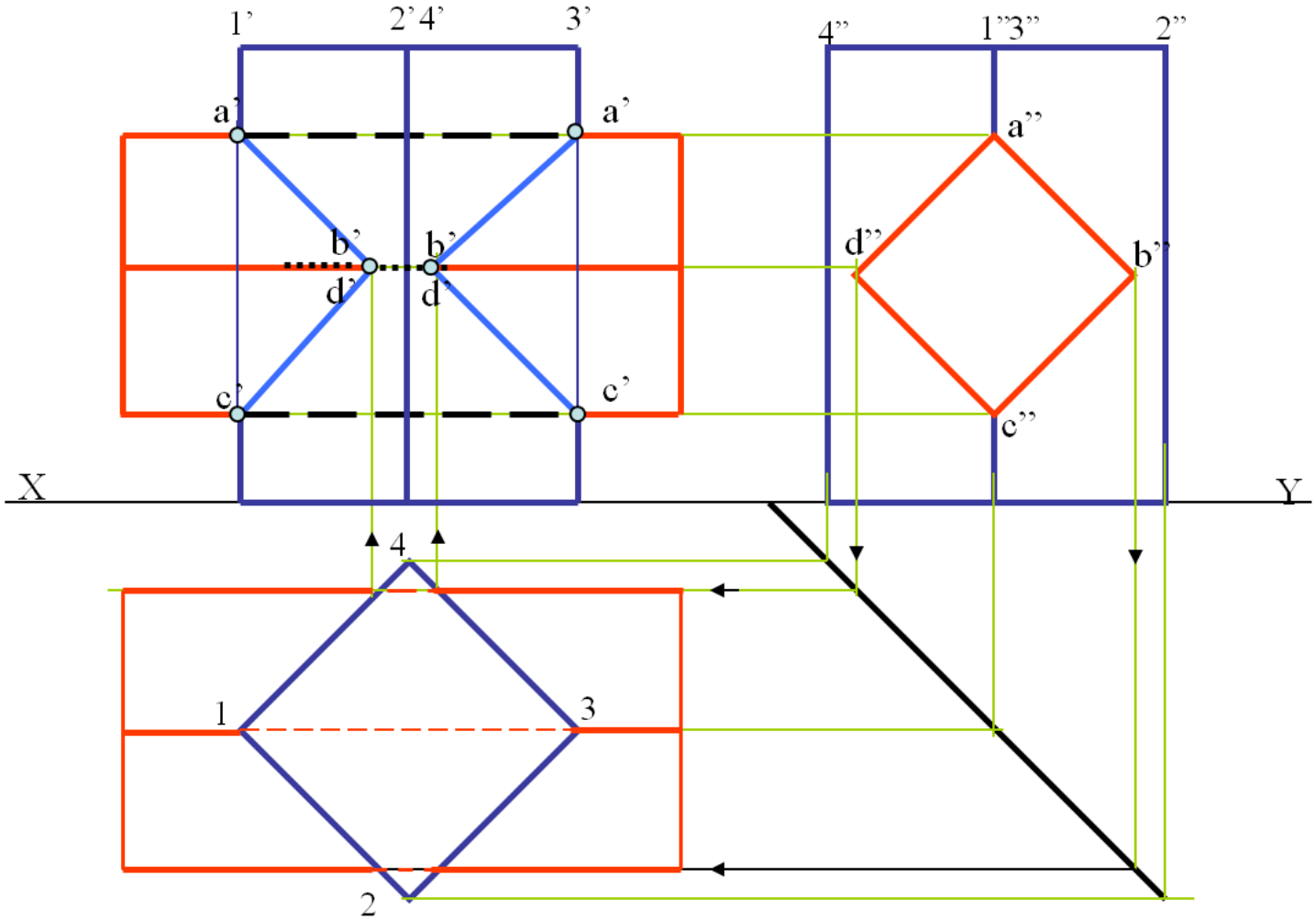

1’
2’4’
3’
4”
1”3”
2”
a”
d”
b”
c”
X
Y
4
1
3
2

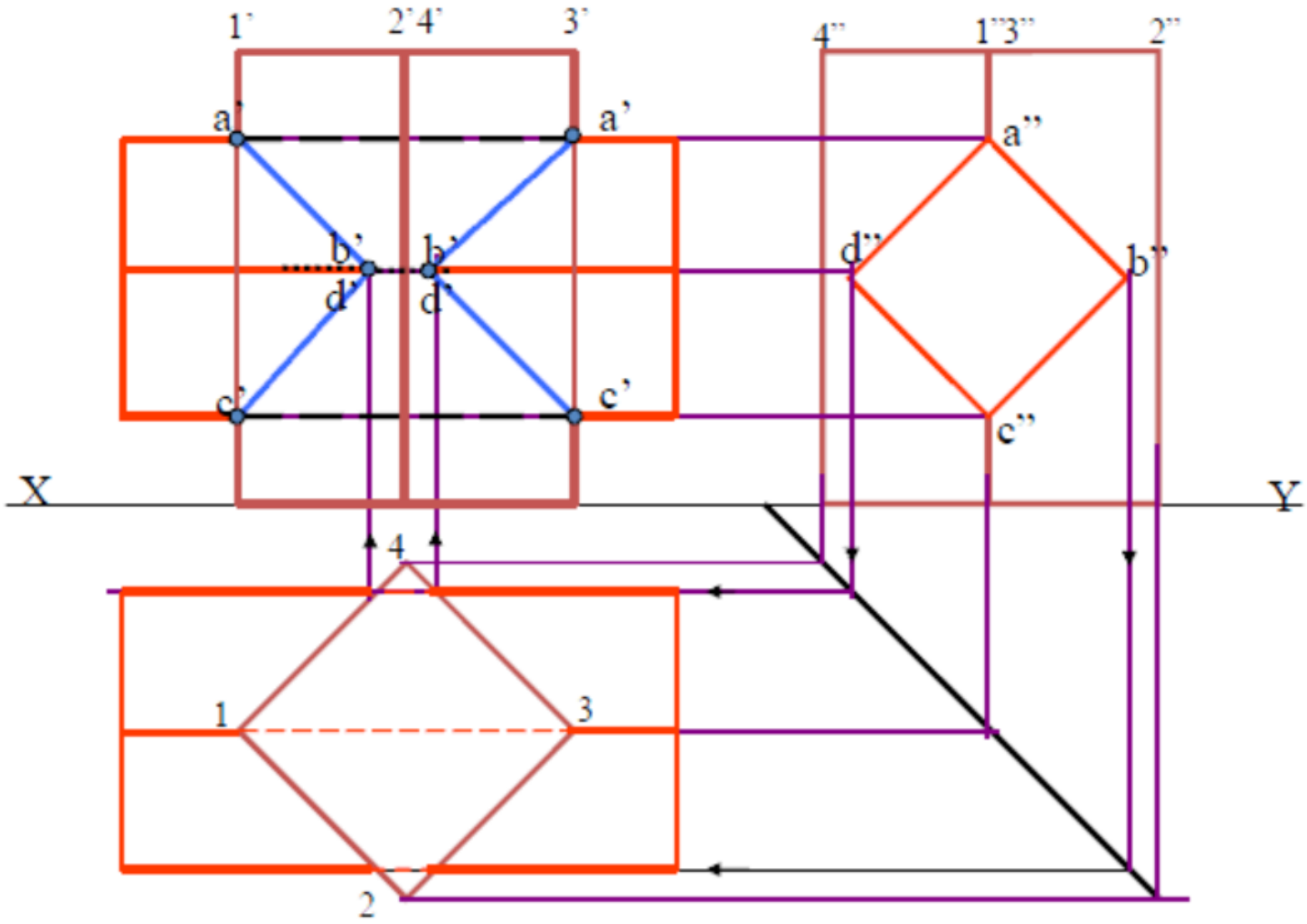

1'
2'4'
3'
4"
1"3"
2"
a"
d"
b"
c"
X
Y
4
1
3
2


1'
2'4'
3'
4"
1"3"
2"
a"
d"
b"
c"
X
Y
4
1
3
2


1’
2’ 4’
3’
4”
1”3”
2”
a”
d”
b”
c”
X
Y
4
1
3
2

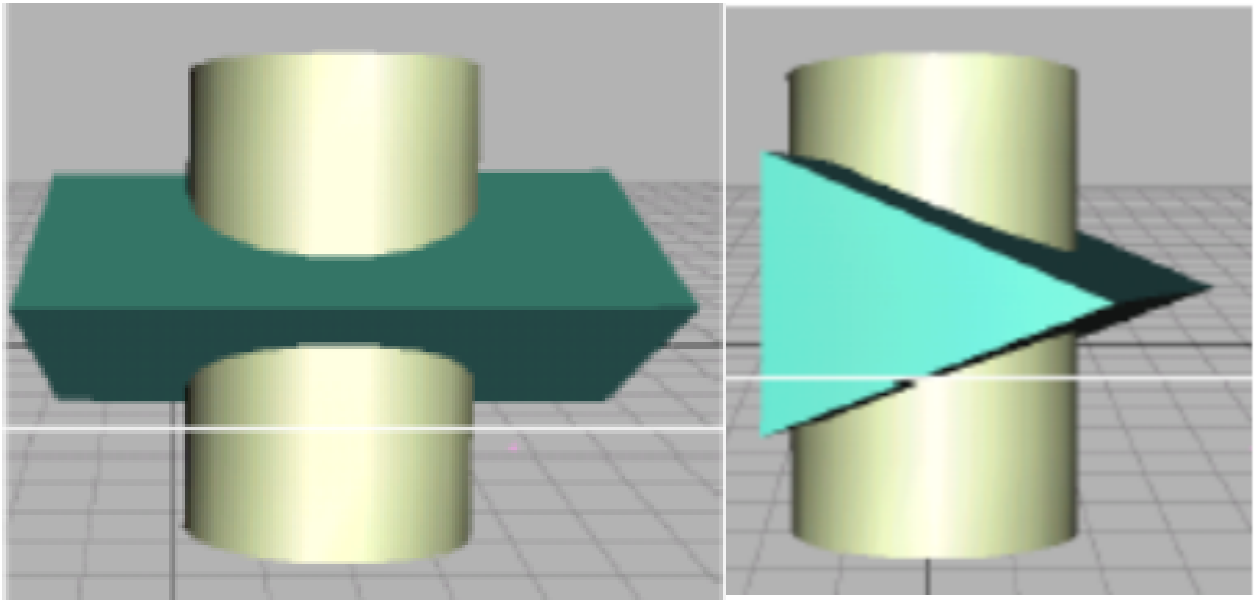

1'
2'4'
3'
4"
1"3"
2"
a'
a'
a"
b'
b'
d'
d'
d"
b"
c'
c'
c"
X
Y
4
1
3
2

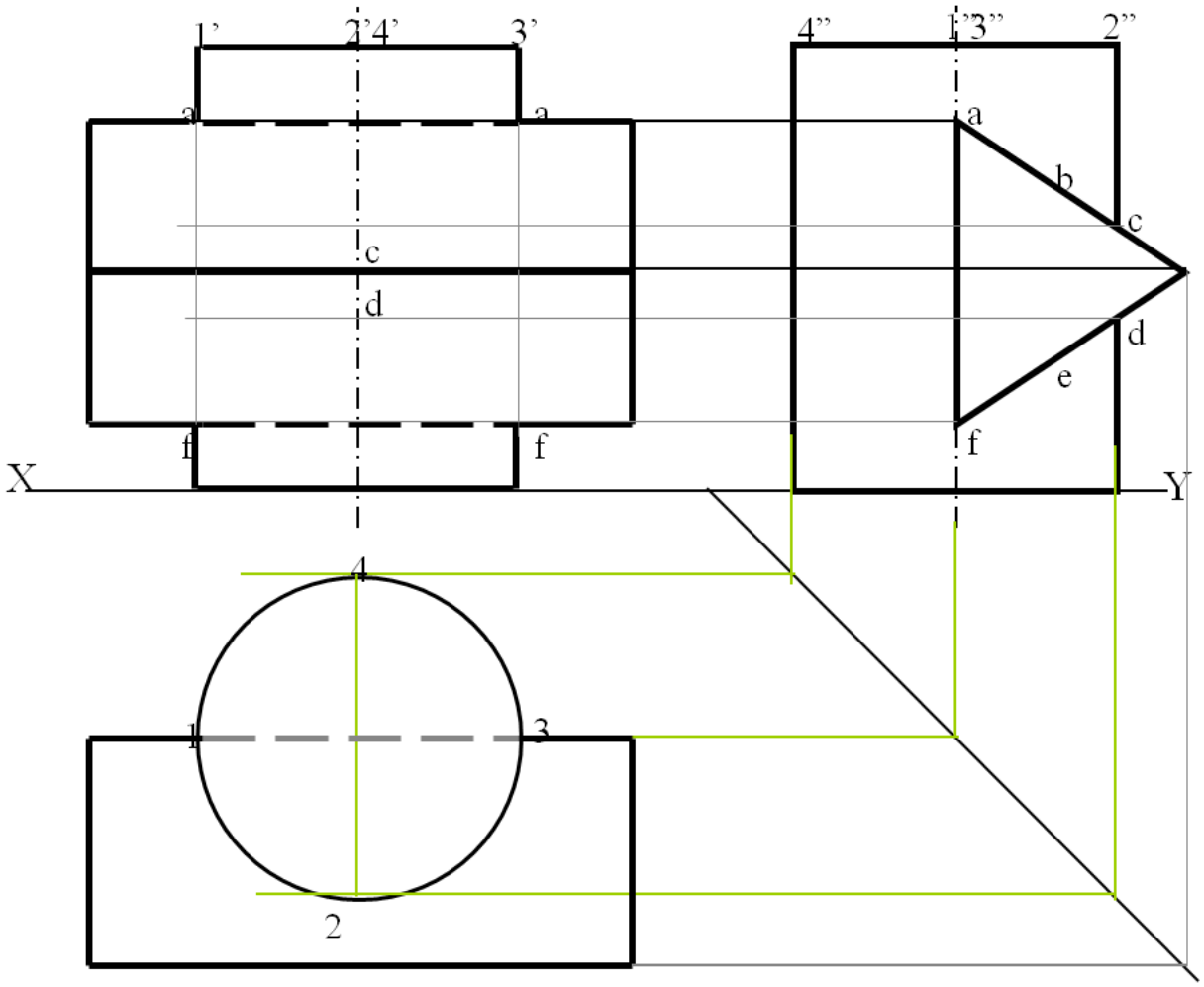

1’
2’4’
3’
4”
1”3”
2”
a’
a’
a”
b’
b’
d”
b”
d’
d’
c’
c’
c”
X
Y
4
1
3
2

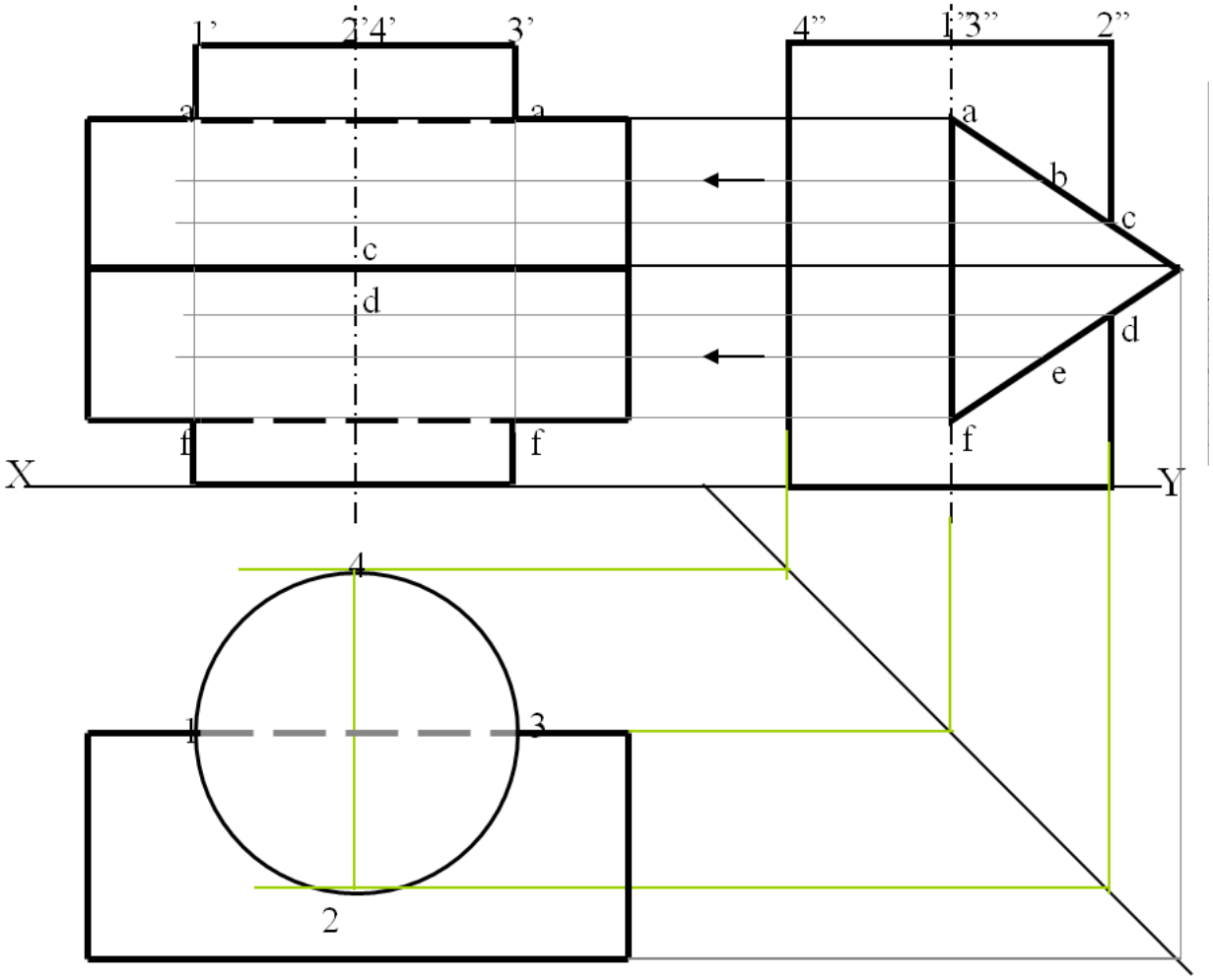

1'
2'4'
3'
4''
1''3''
2''
a'
a'
a''
b'
b'
d''
b''
d'
d'
c'
c'
c''
X
Y
4
1
3
2

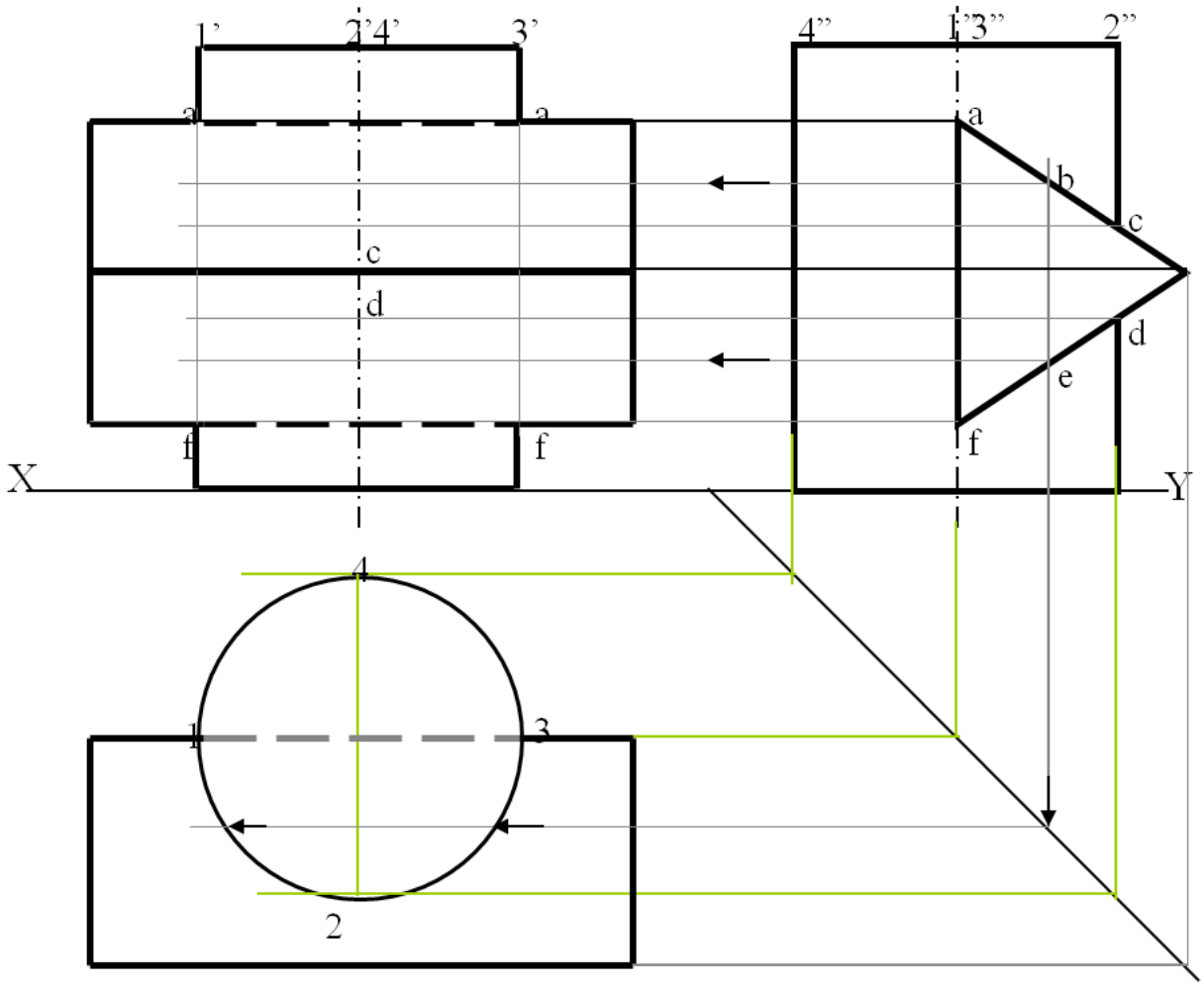
CYLINDER STANDING & TRIANGULAR PRISM PENETRATING

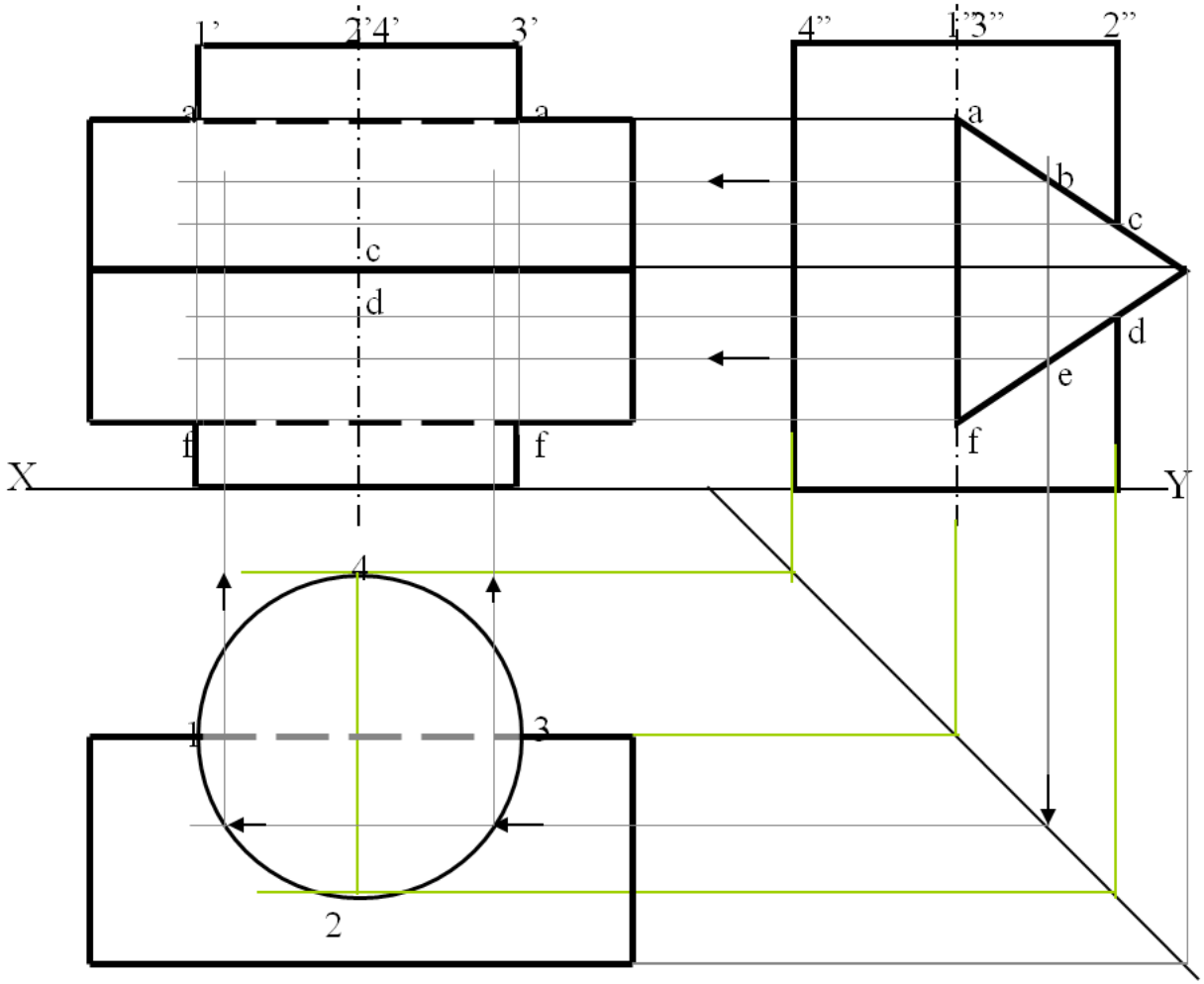
Problem: A cylinder 50mm dia. and 70mm axis is completely penetrated by a triangular prism of 45 mm sides and 70 mm axis, horizontally. One flat face of prism is parallel to Vp and Contains axis of cylinder. Draw projections showing curves of intersections.

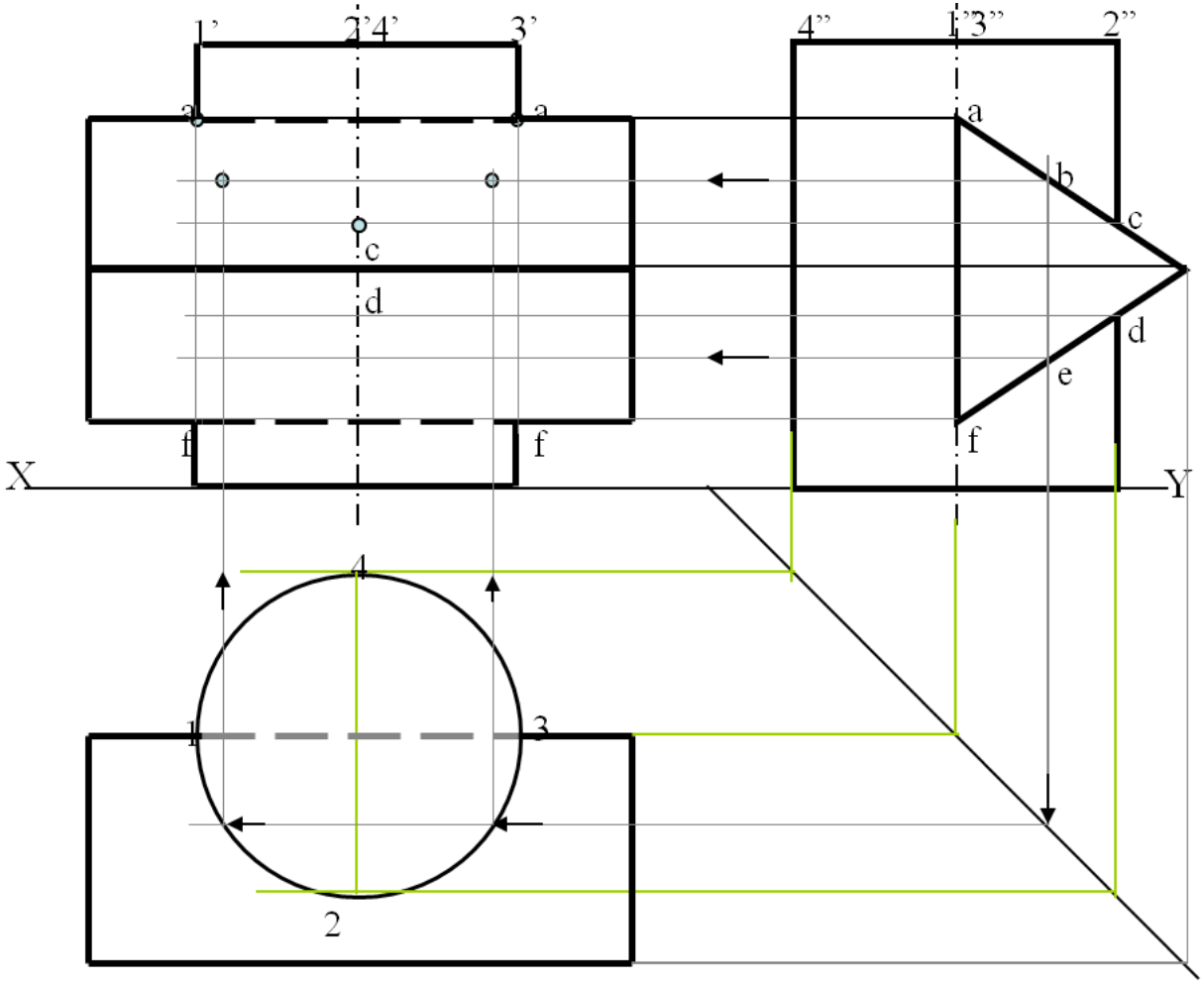


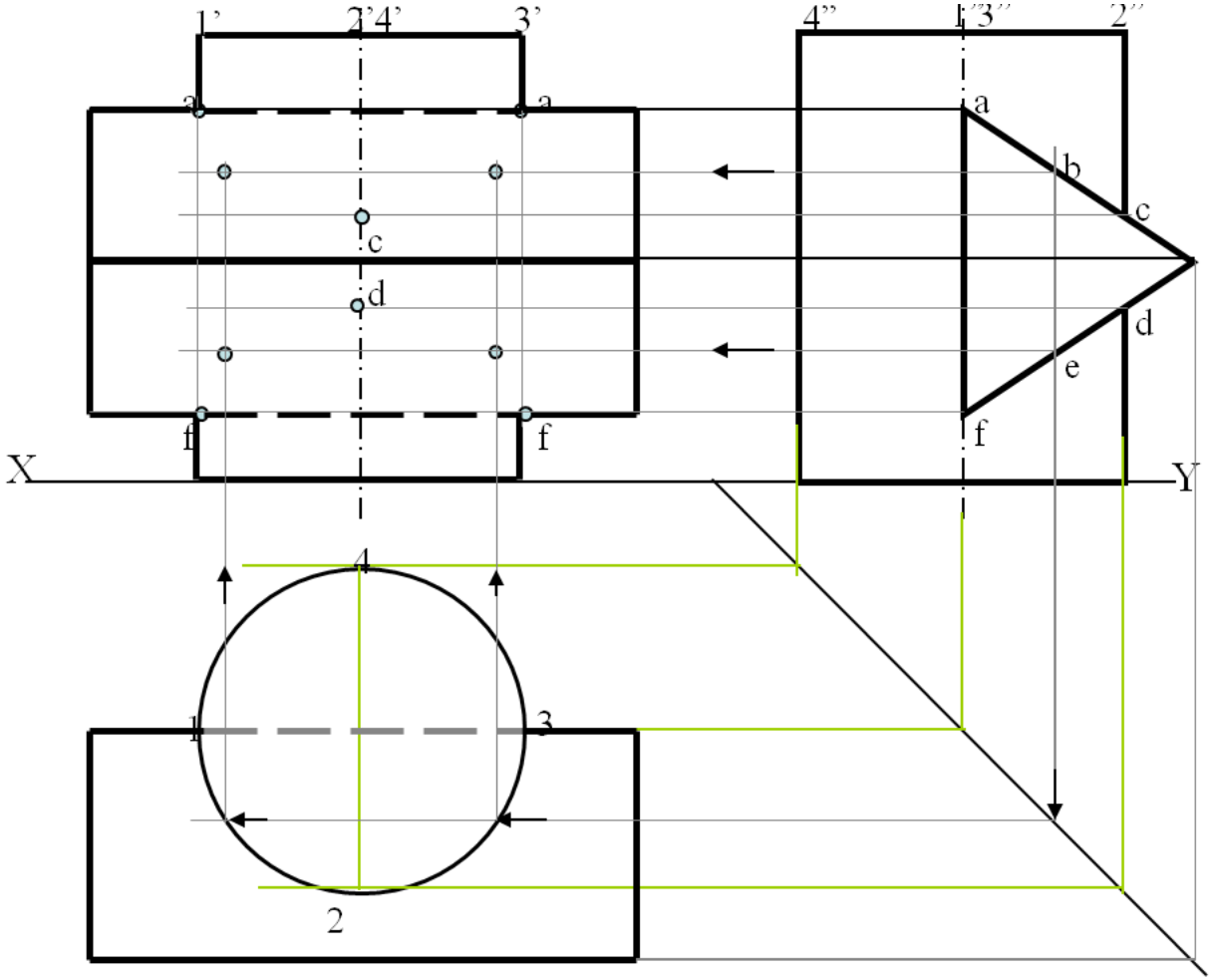

1'
2'4'
3'
4"
1"3"
2"
a
a
a
b
c
c
d
d
e
f
f
f
X
Y
4
1
3
2

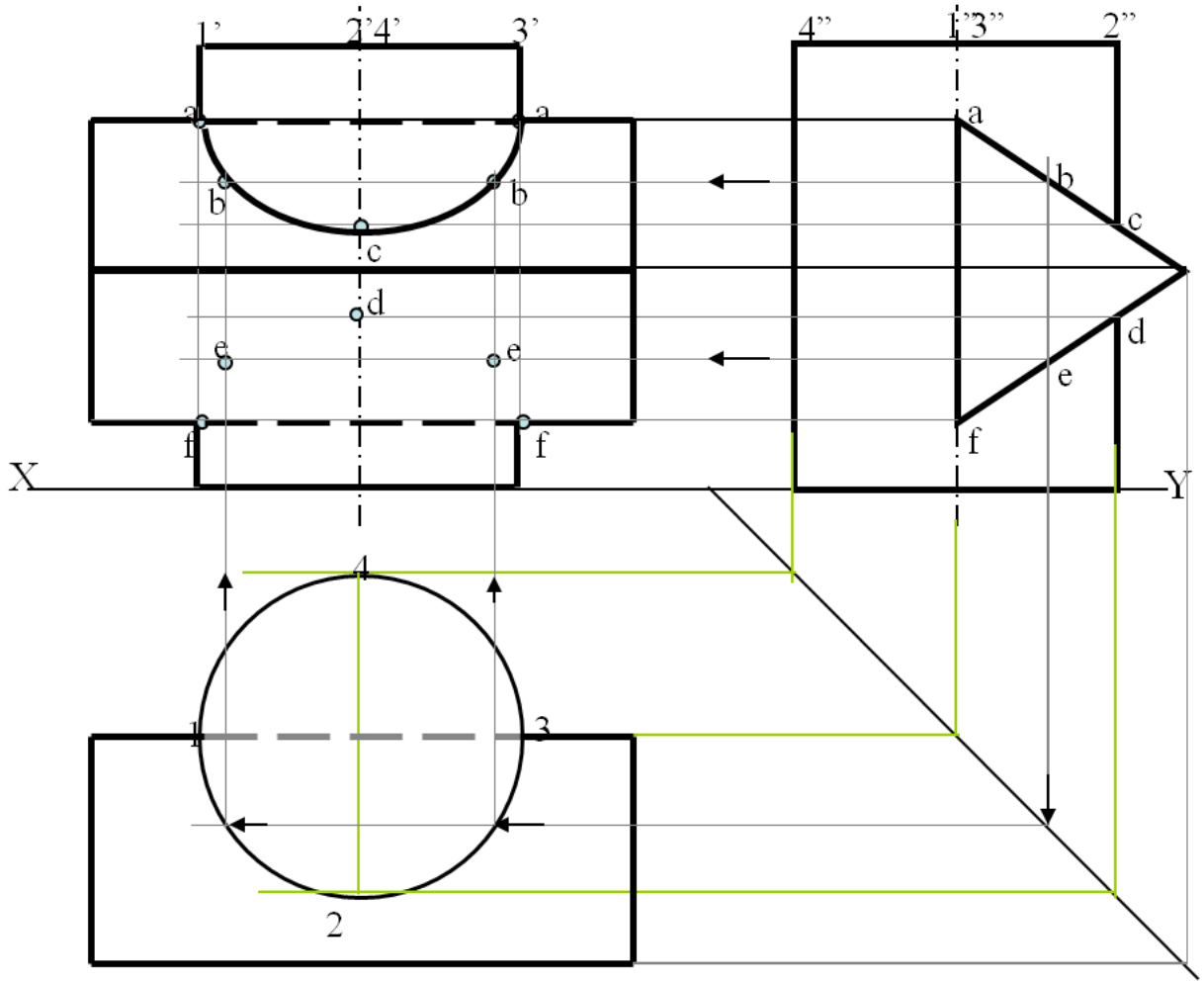

1’
2’4’
3’
4”
1”3”
2”
a
a
a
b
c
c
d
d
e
f
f
f
X
Y
4
1
3
2

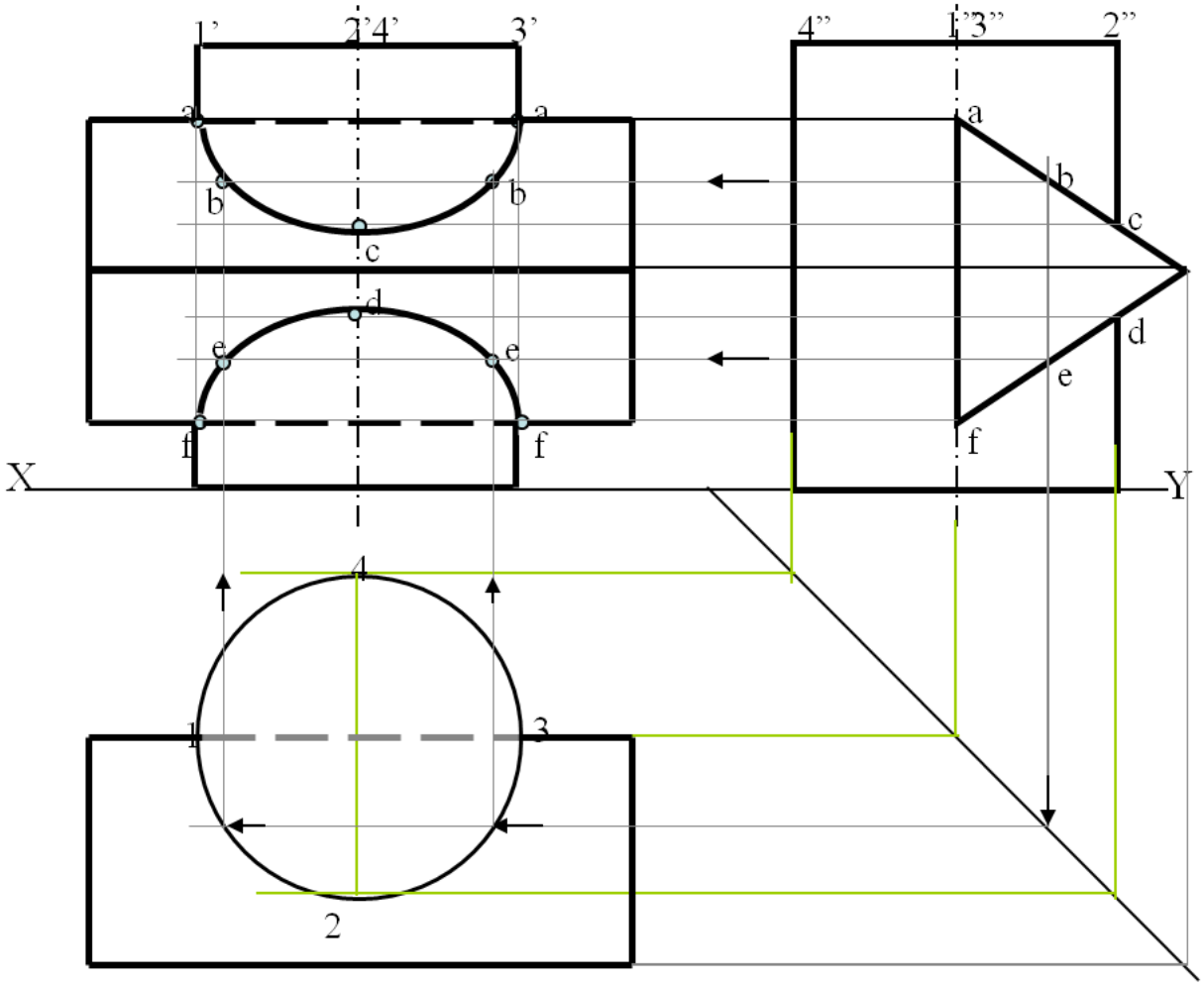

1'
2'4'
3'
4"
1"3"
2"
a
a
a
b
c
c
d
d
e
f
f
f
X
Y
4
1
3
2

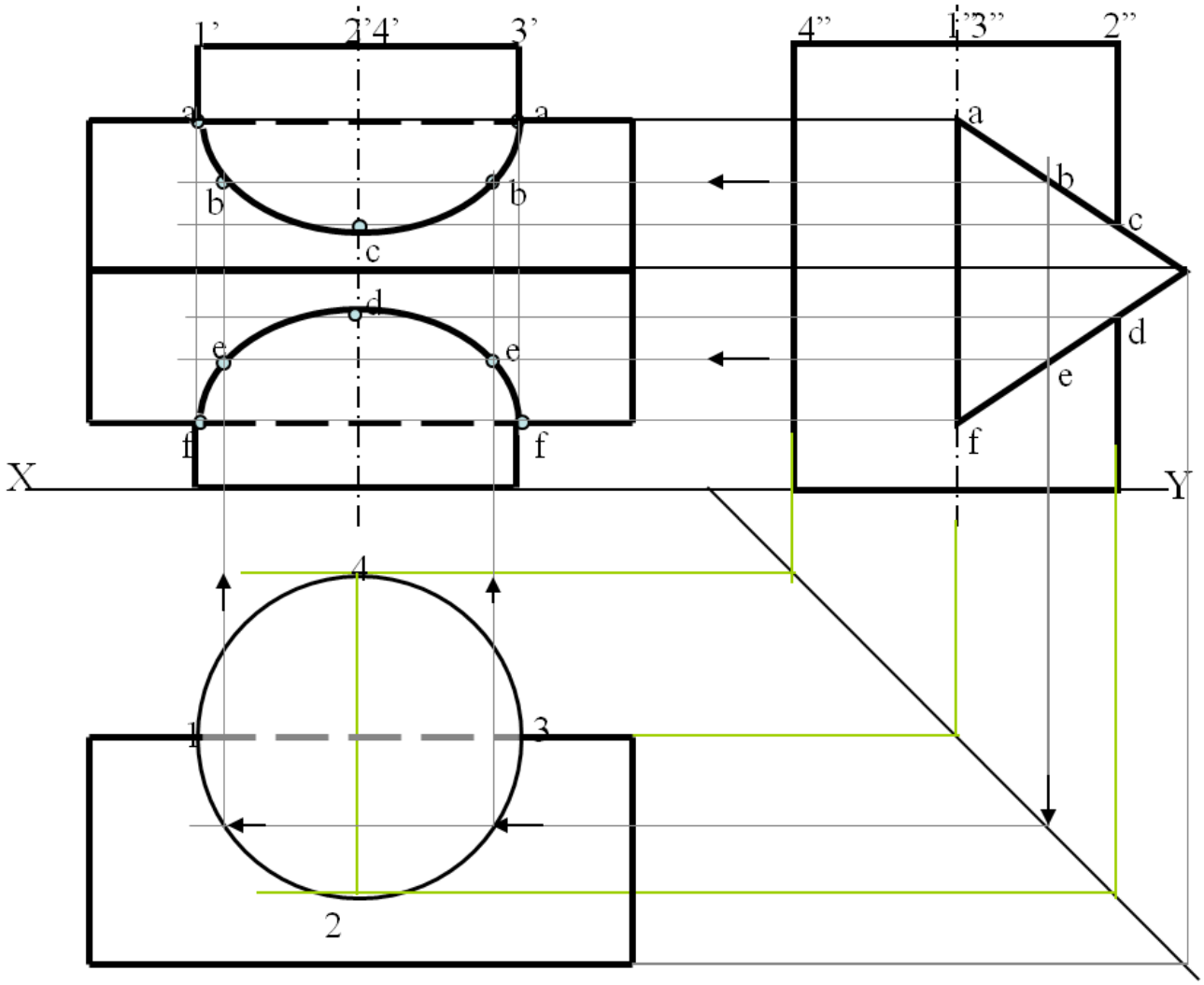

1'
2'4'
3'
4"
1"3"
2"
a
a
a
b
c
c
d
d
e
f
f
f
X
Y
4
1
3
2


1’
2’4’
3’
4”
1”3”
2”
a
a
a
b
c
c
d
d
e
f
f
f
X
Y
4
1
3
2


1'
2'4'
3'
4''
1''3''
2''
a
a
a
b
c
c
d
d
e
f
f
f
X
Y
4
1
3
2

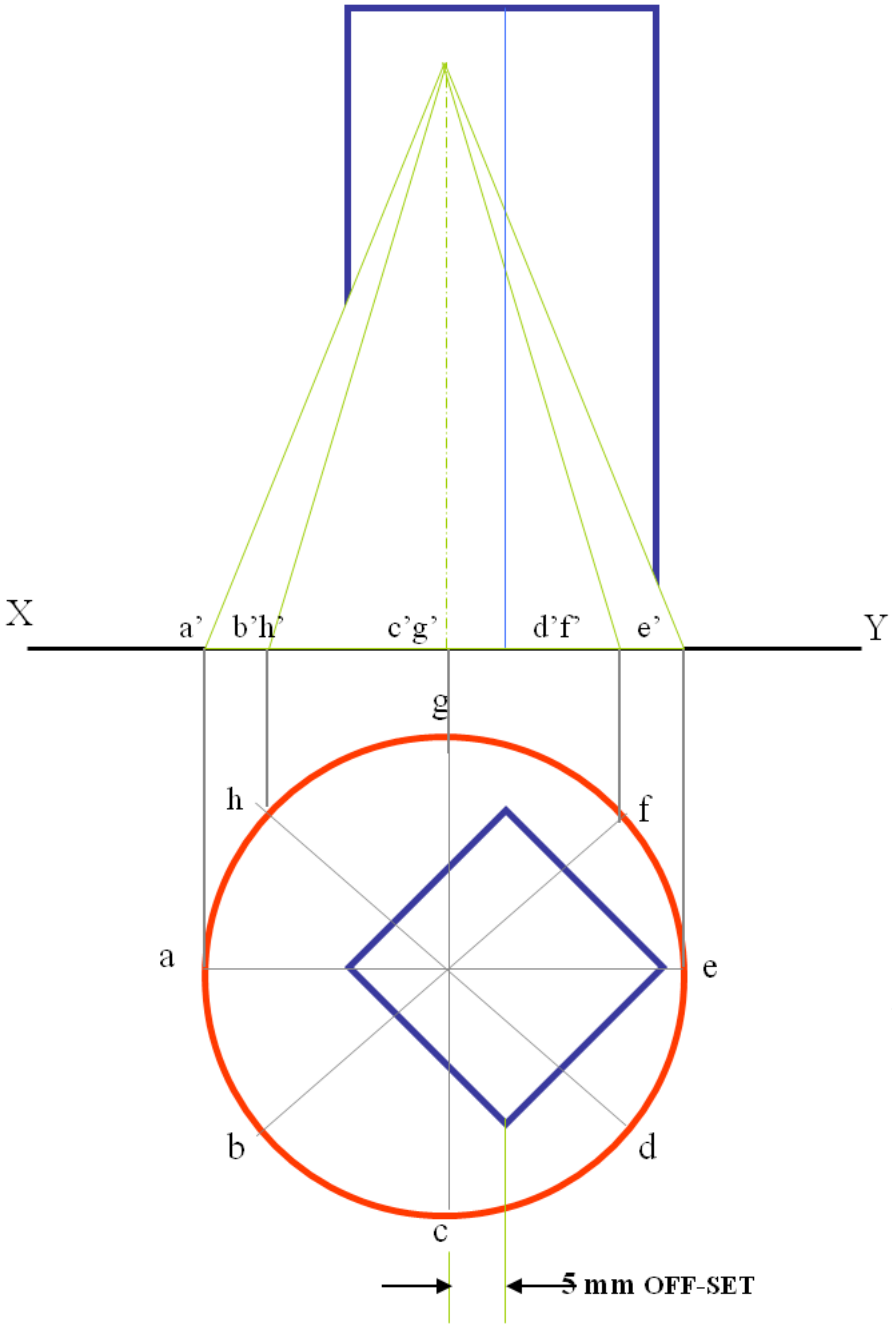

1'
2'4'
3'
4"
1"3"
2"
a
b
c
d
e
f
X
Y
4
1
3
2

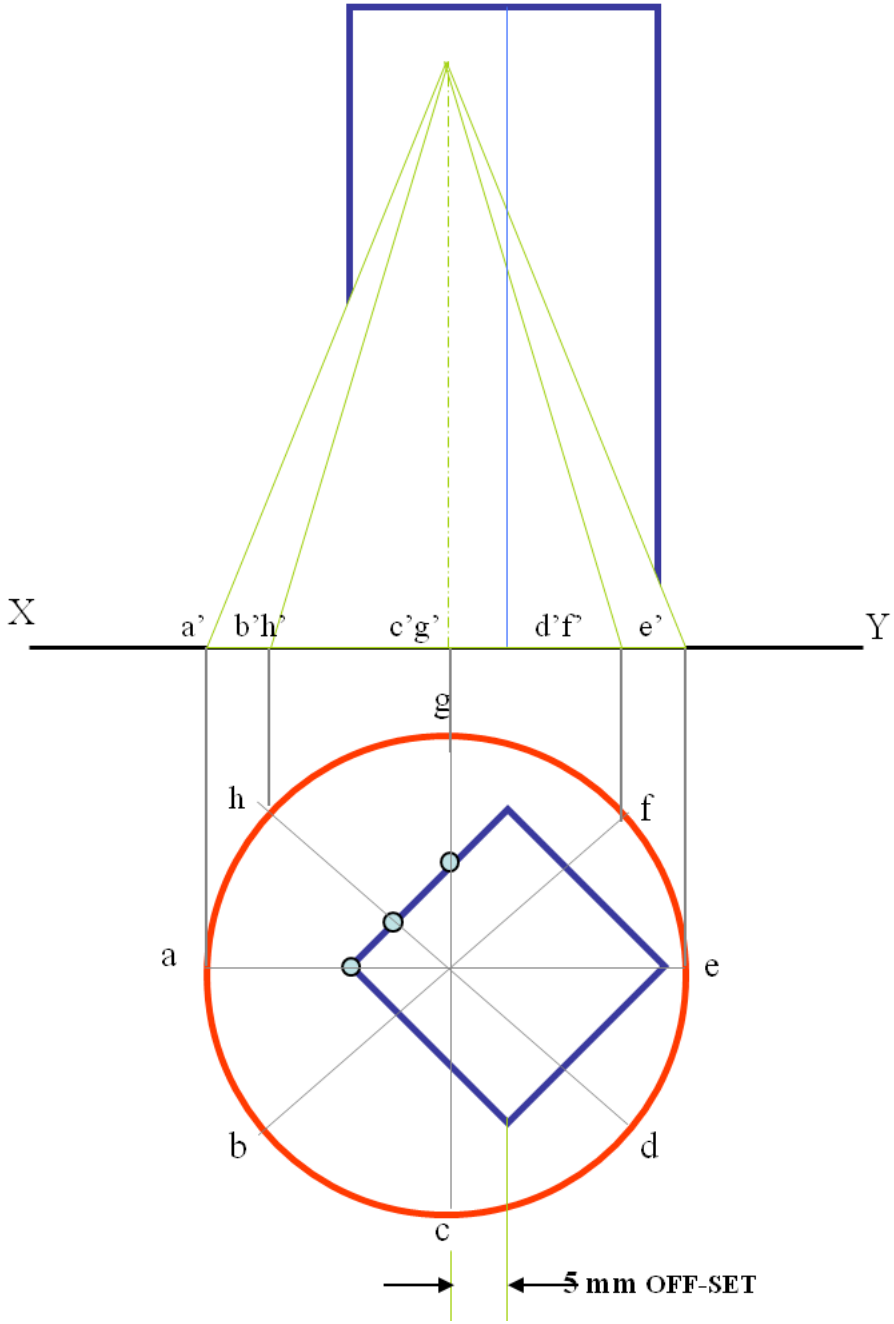

1'
2'4'
3'
4"
1"3"
2"
a
b
c
d
e
f
X
Y
4
1
3
2

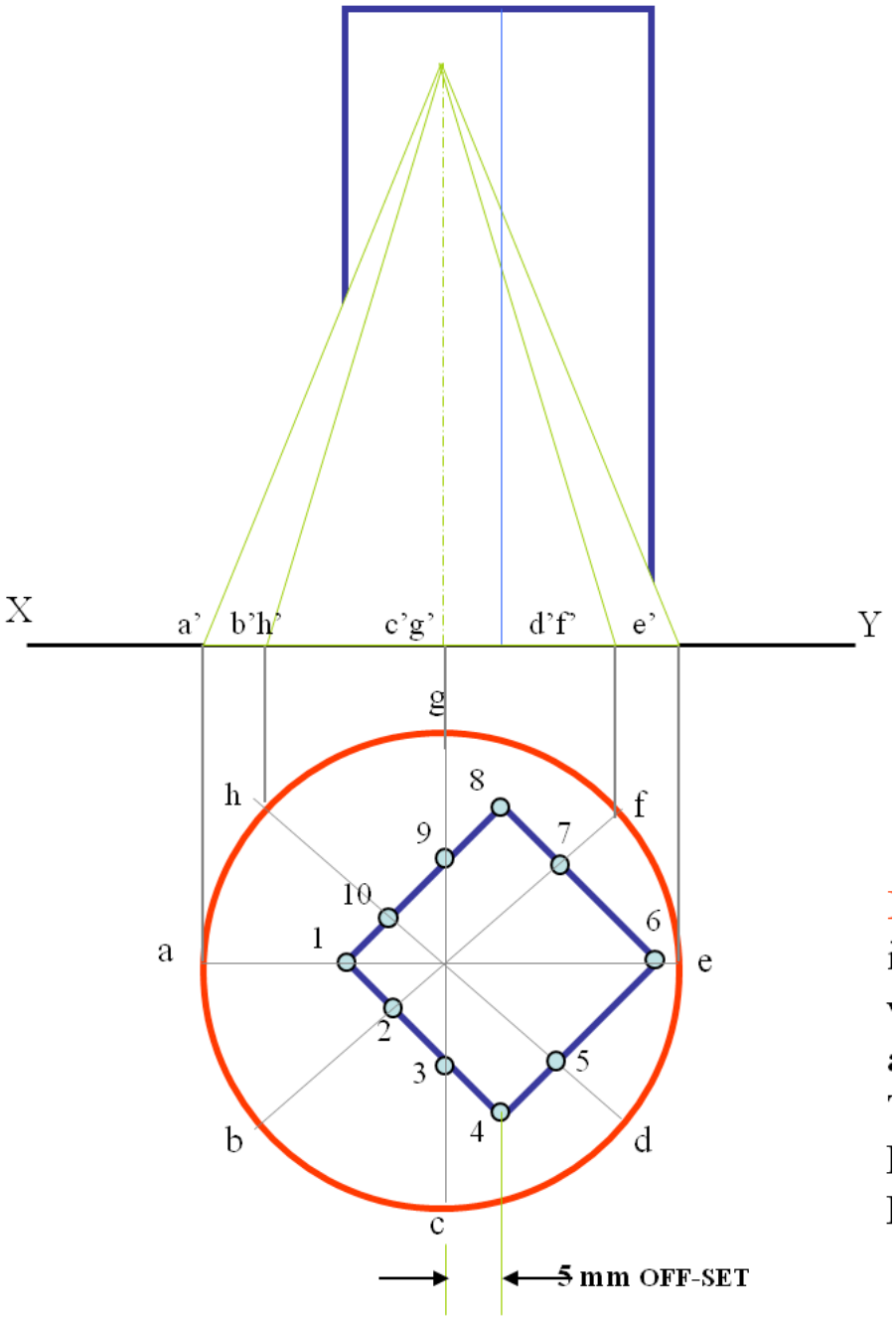

1'
2'4'
3'
4"
1"3"
2"
a
b
c
d
e
f
X
Y
4
1
3
2

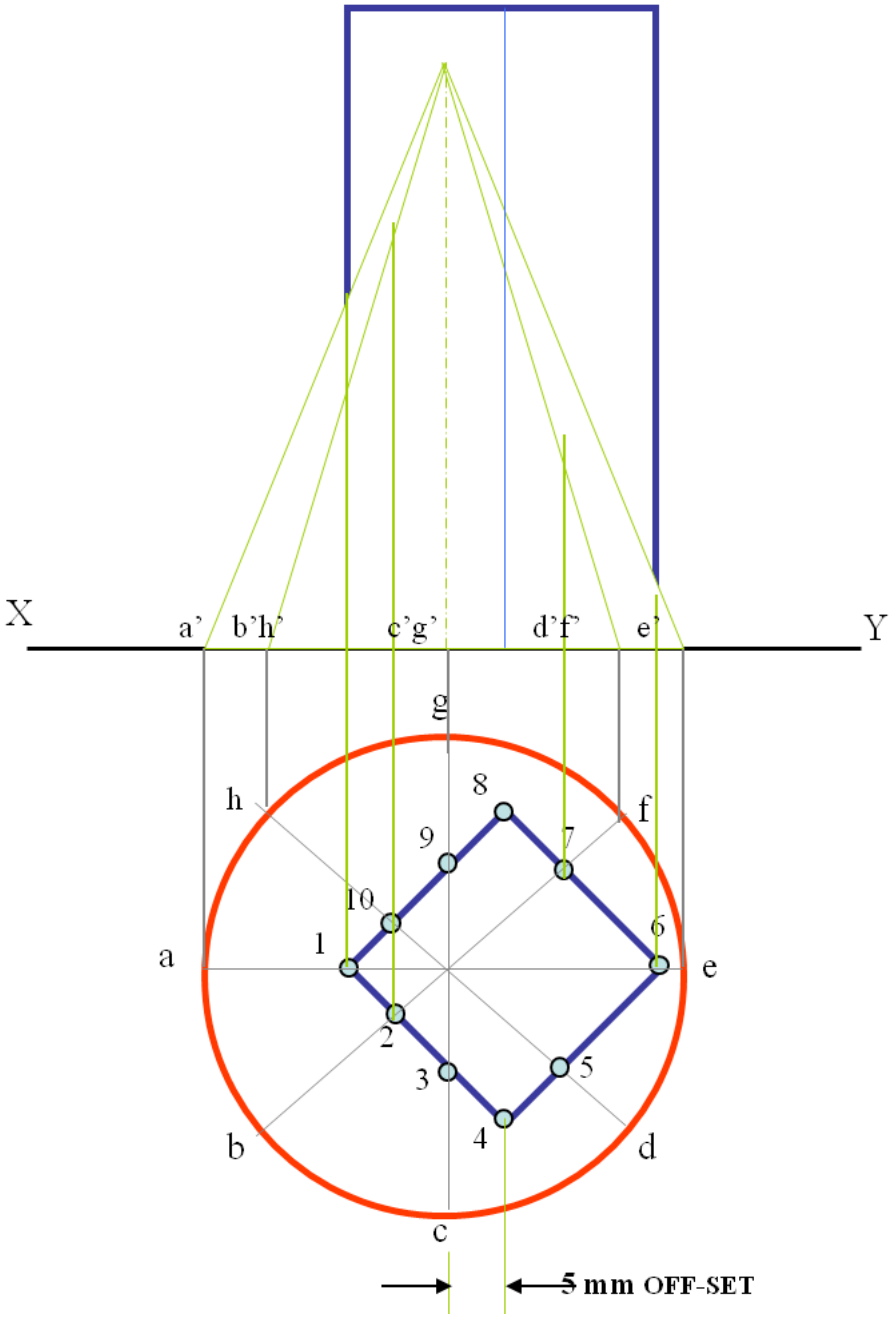
CONE STANDING & SQ.PRISM PENETRATING (BOTH AXES VERTICAL)

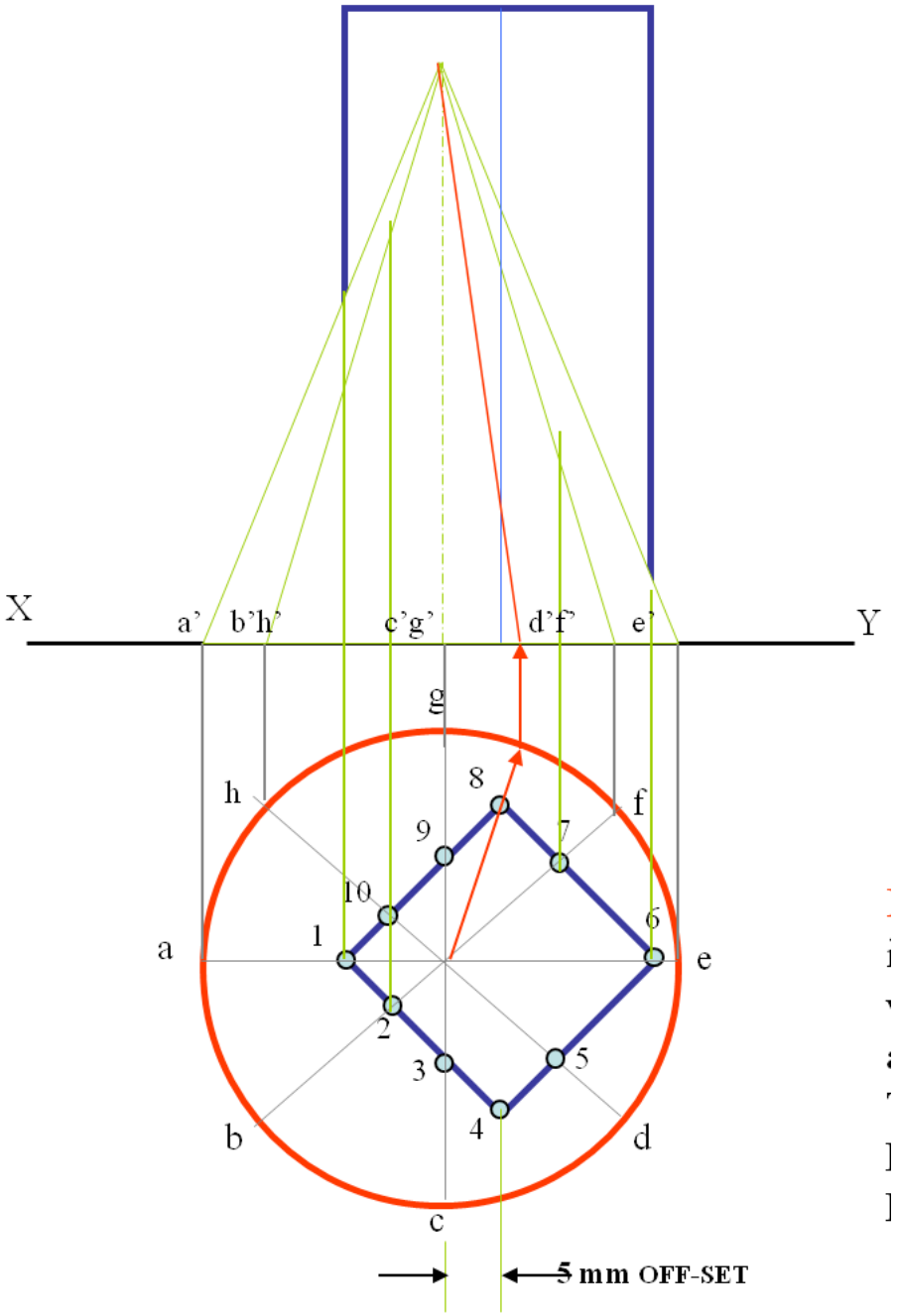
Problem: A cone70 mm base diameter and 90 mm axis is completely penetrated by a square prism from top with it’s axis parallel to cone’s axis and 5 mm away from it. a vertical plane containing both axes is parallel to Vp. Take all faces of sq.prism equally inclined to Vp. Base Side of prism is 0 mm and axis is 100 mm long. Draw projections showing curves of intersections.

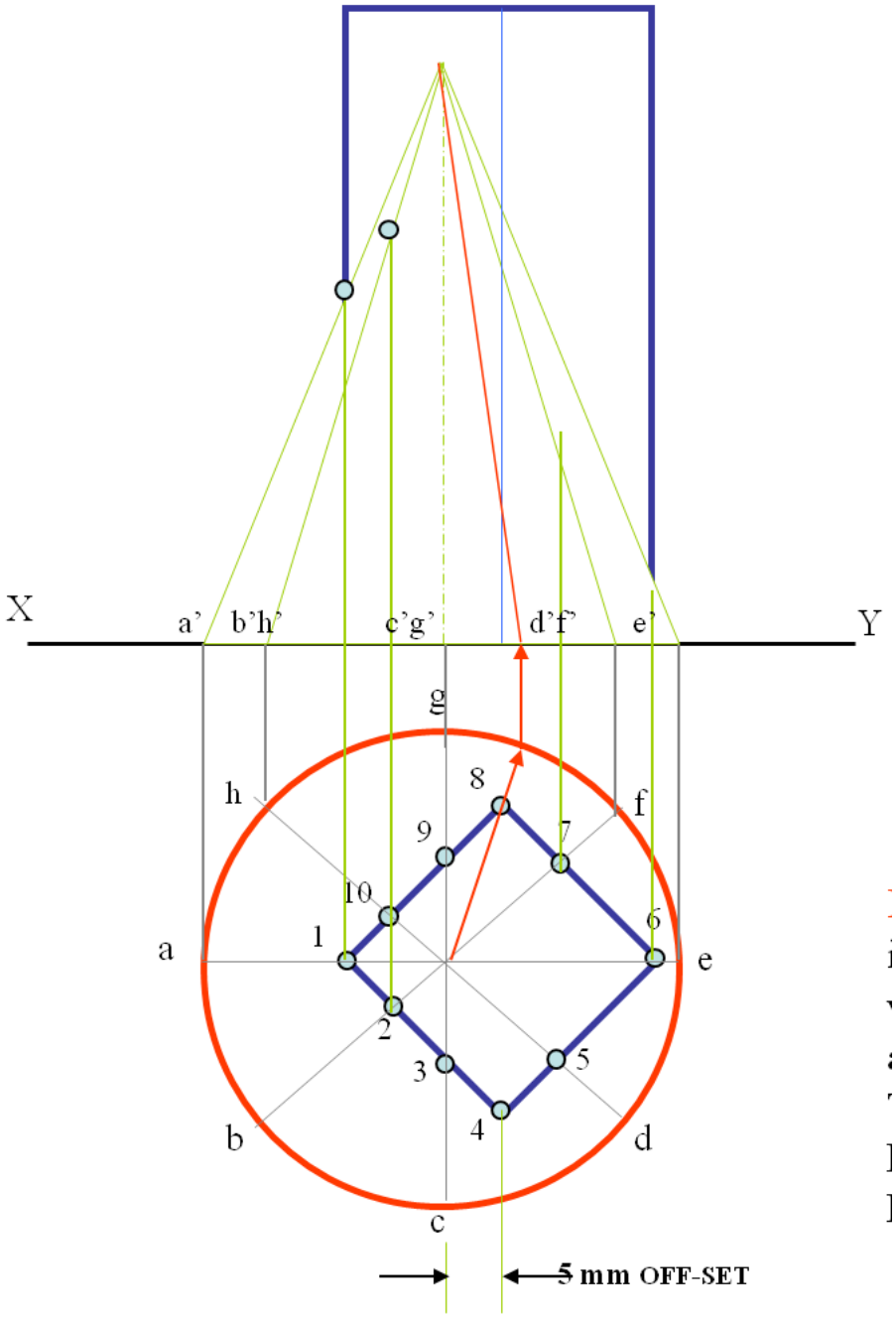

X
Y
a'
b'h'
c'g'
d'f'
e'
g
h
f
a
e
b
d
c
5 mm OFF-SET

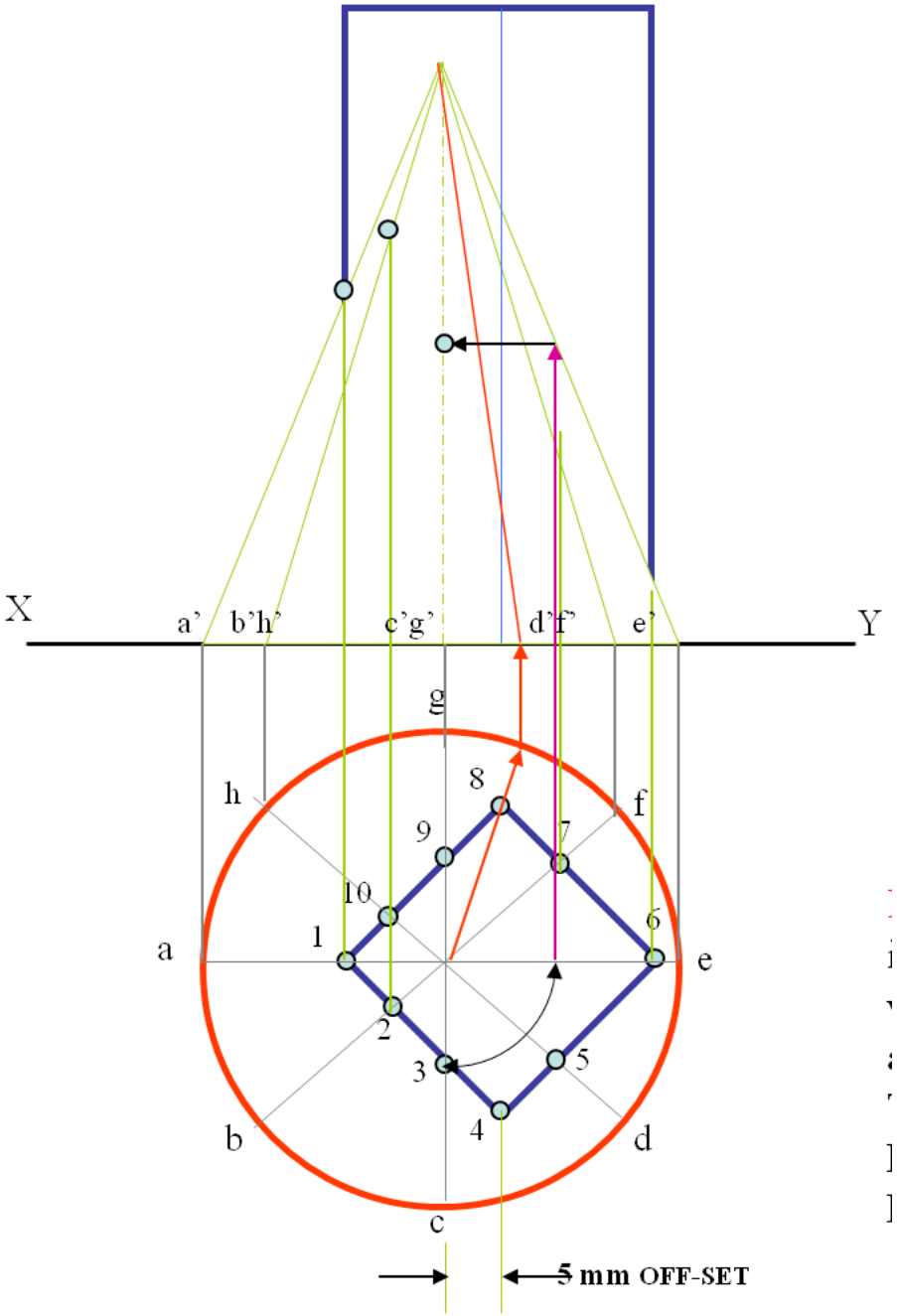

X
Y
a'
b'h'
c'g'
d'f'
e'
g
h
f
a
e
b
d
c
5 mm OFF-SET

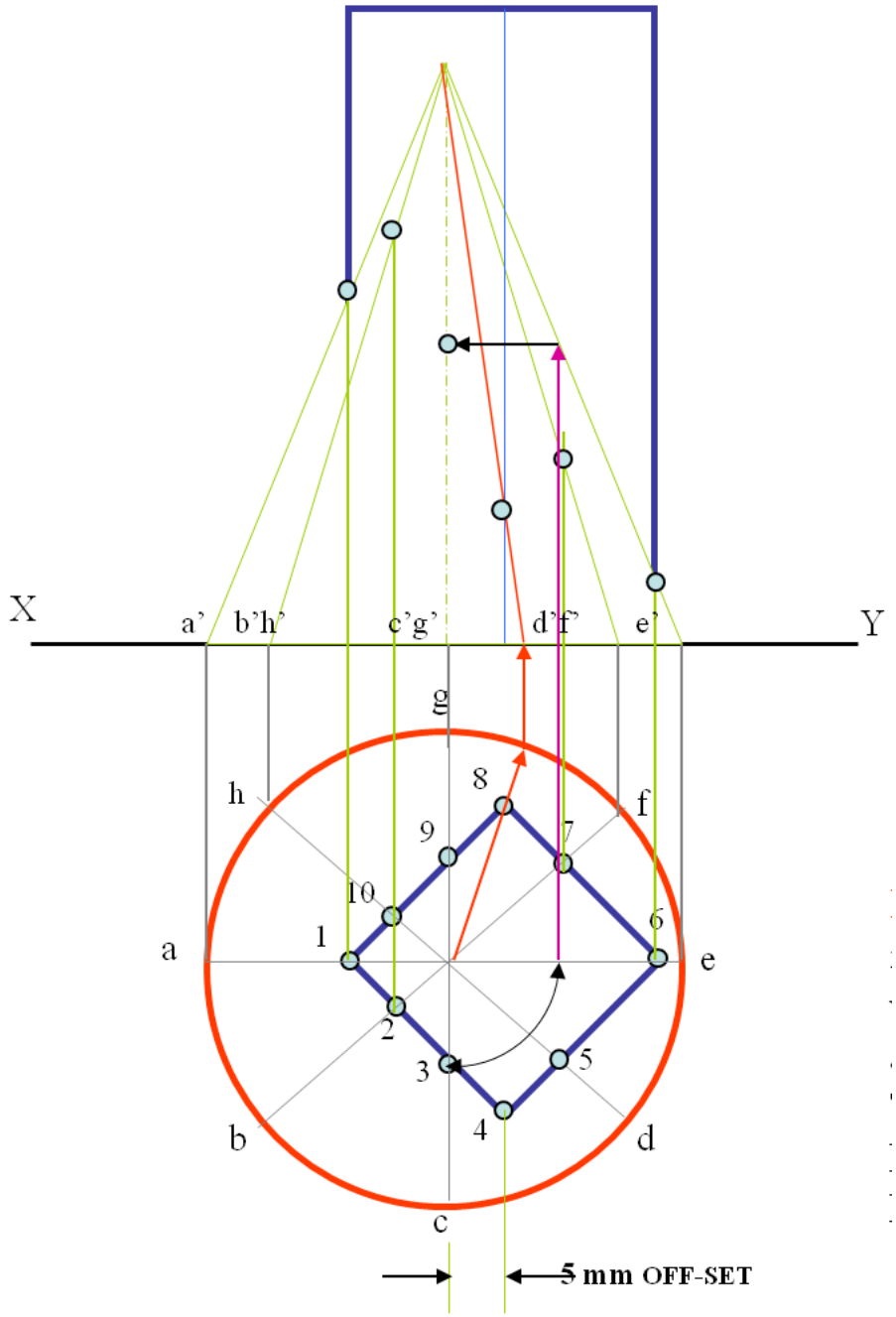

X
Y
a'
b'h'
c'g'
d'f'
e'
g
h
f
8
9
7
10
6
1
a
e
2
3
5
4
b
d
c
5 mm OFF-SET

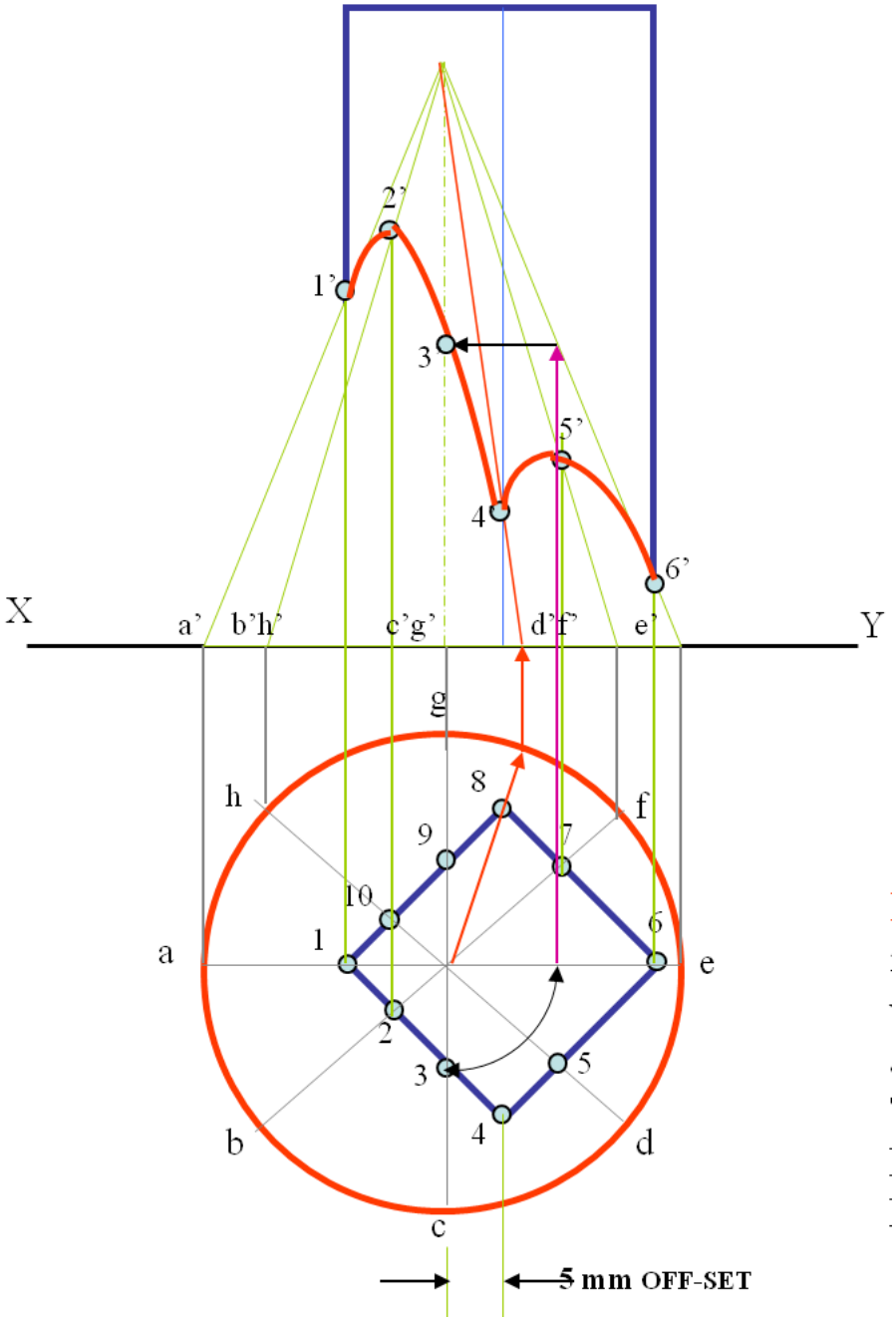

X
Y
a'
b'h'
c'g'
d'f'
e'
g
h
8
f
9
7
10
6
1
a
e
2
3
5
4
b
d
c
5 mm OFF-SET

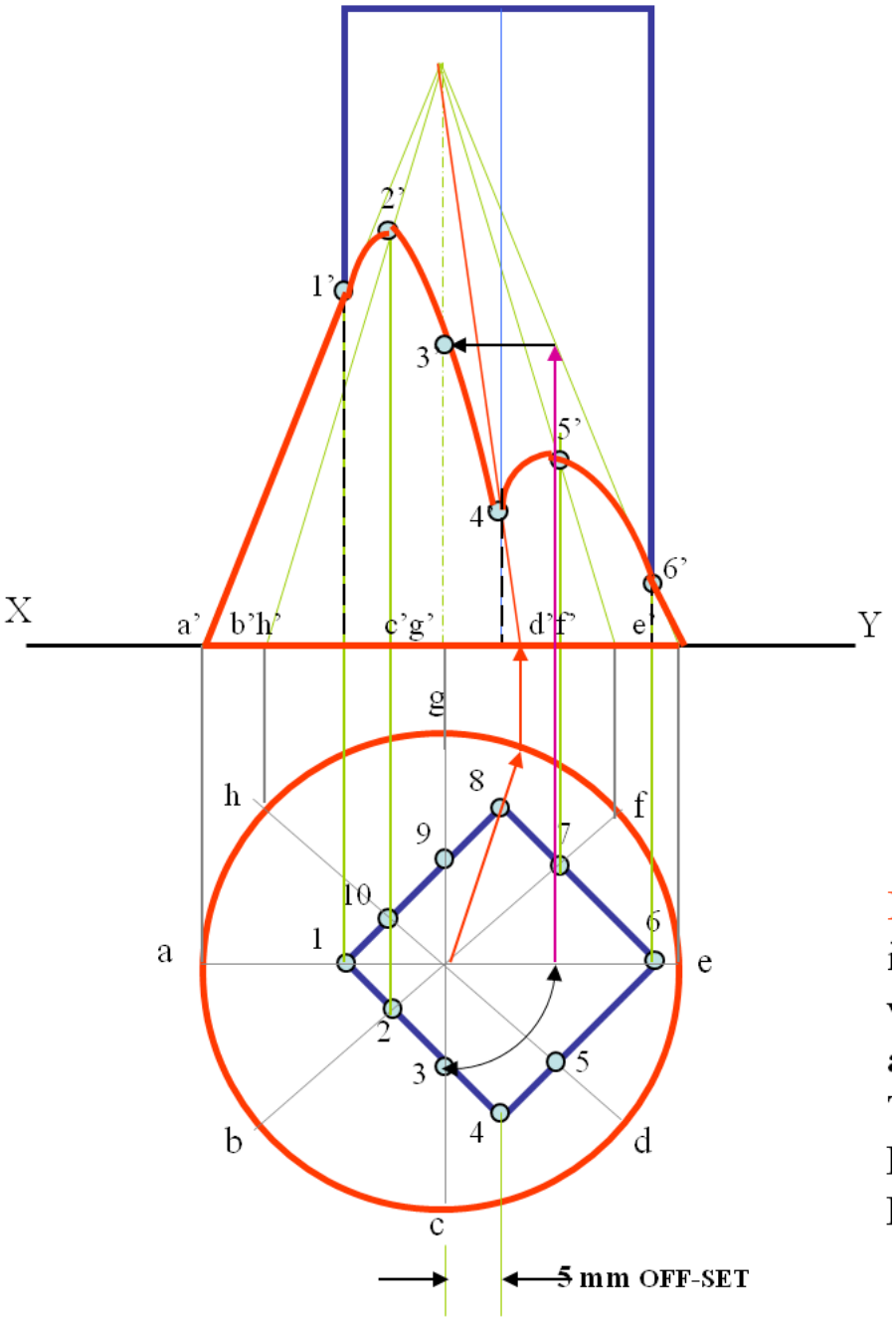

X
Y
a'
b'h'
c'g'
d'f'
e'
g
h
f
8
9
7
10
6
1
a
e
2
3
5
4
b
d
c
5 mm OFF-SET

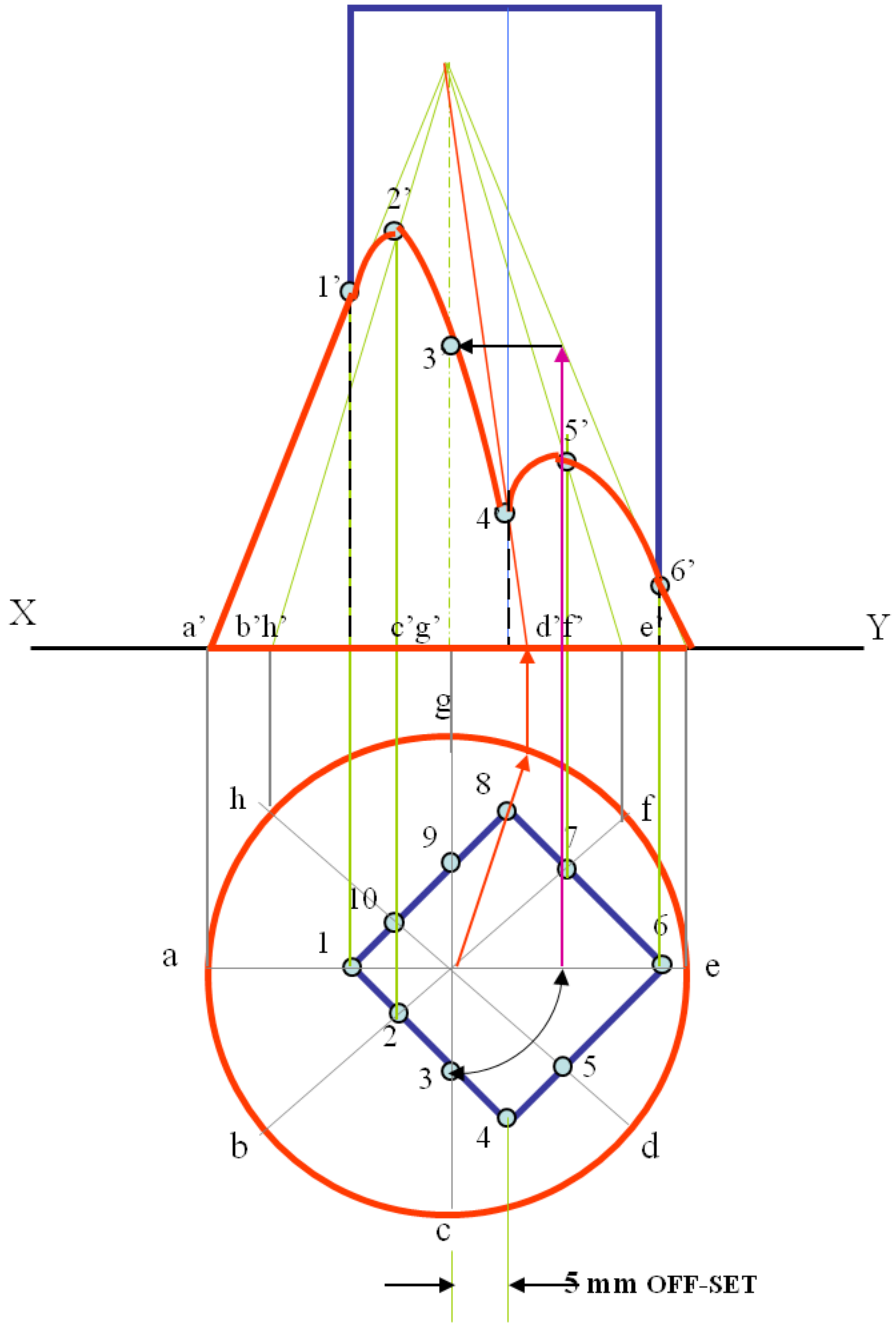

X
Y
a'
b'h'
c'g'
d'f'
e'
g
h
f
8
9
7
10
6
1
a
e
2
3
5
4
b
d
c
5 mm OFF-SET

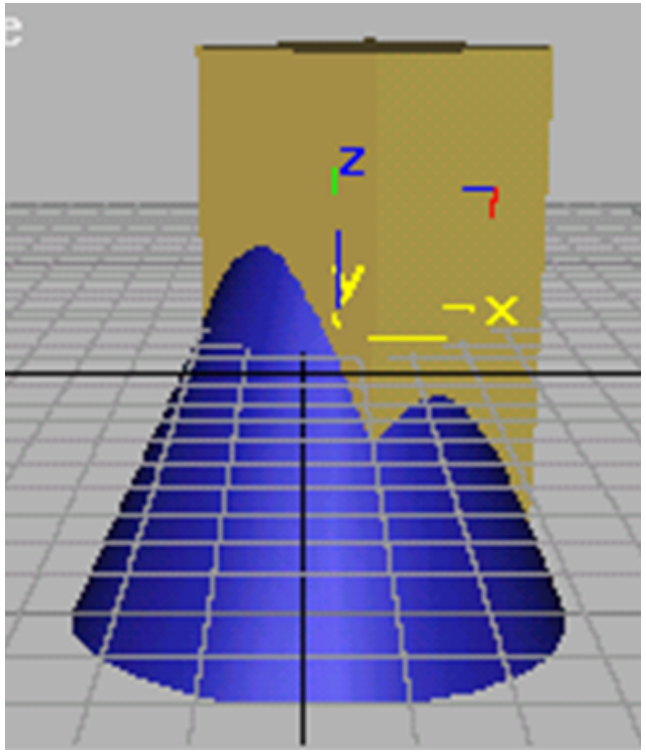

X
Y
a'
b'h'
c'g'
d'f'
e'
g
h
f
8
9
7
10
6
1
a
e
2
3
5
4
b
d
c
5 mm OFF-SET


X
Y
a'
b'h'
c'g'
d'f'
e'
g
h
8
f
9
7
10
6
1
a
e
2
3
5
4
b
d
c
5 mm OFF-SET


X
Y
a'
b'h'
c'g'
d'f'
e'
1'
2'
3
4
5'
6'
g
h
f
8
9
7
10
6
1
a
e
2
3
5
4
b
d
c
5 mm OFF-SET

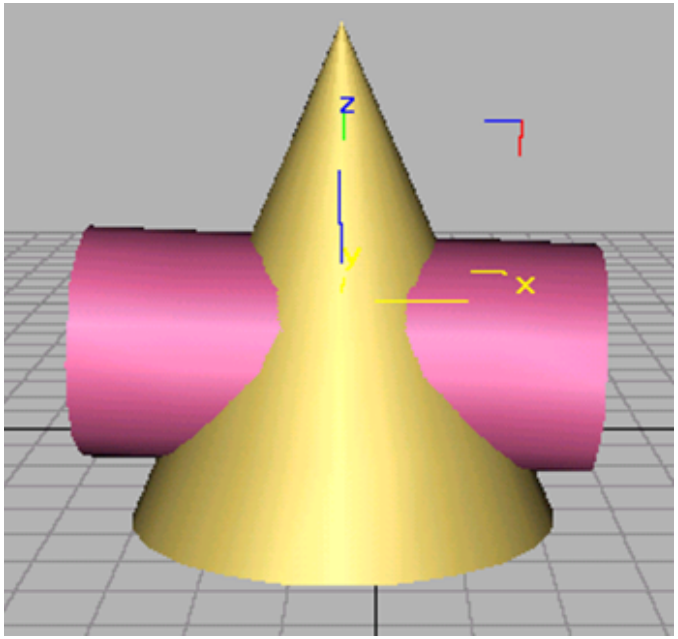

X
Y
a'
b'h'
c'g'
d'f'
e'
1'
2'
3
4
5'
6'
g
h
f
8
9
7
10
1
6
a
e
2
3
5
4
b
d
c
5 mm OFF-SET

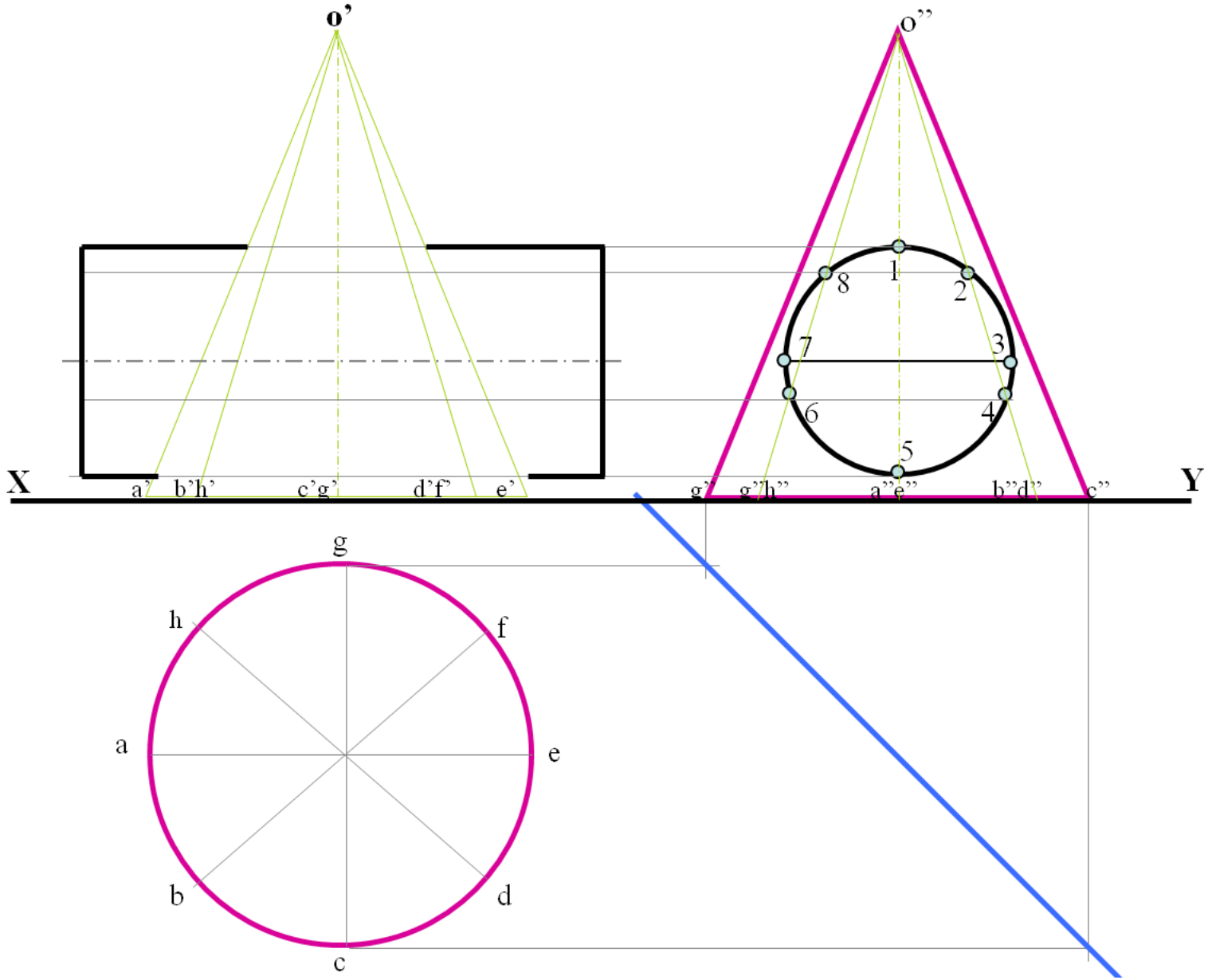

X
Y
a'
b'h'
c'g'
d'f'
e'
1'
2'
3
4
5'
6'
g
h
f
a
e
b
d
c
1
2
3
4
5
6
7
8
9
10
5 mm OFF-SET

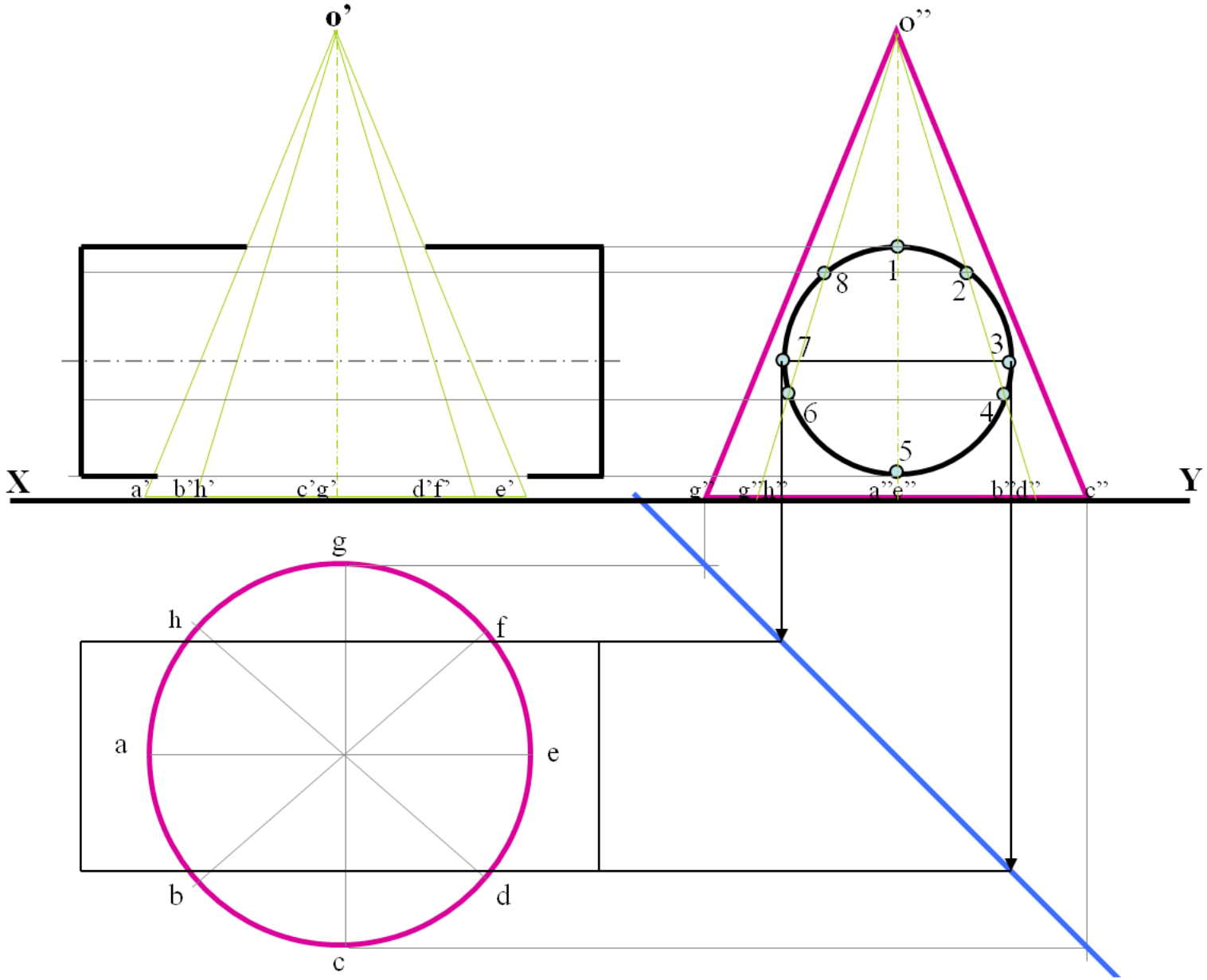

Z
Y
X

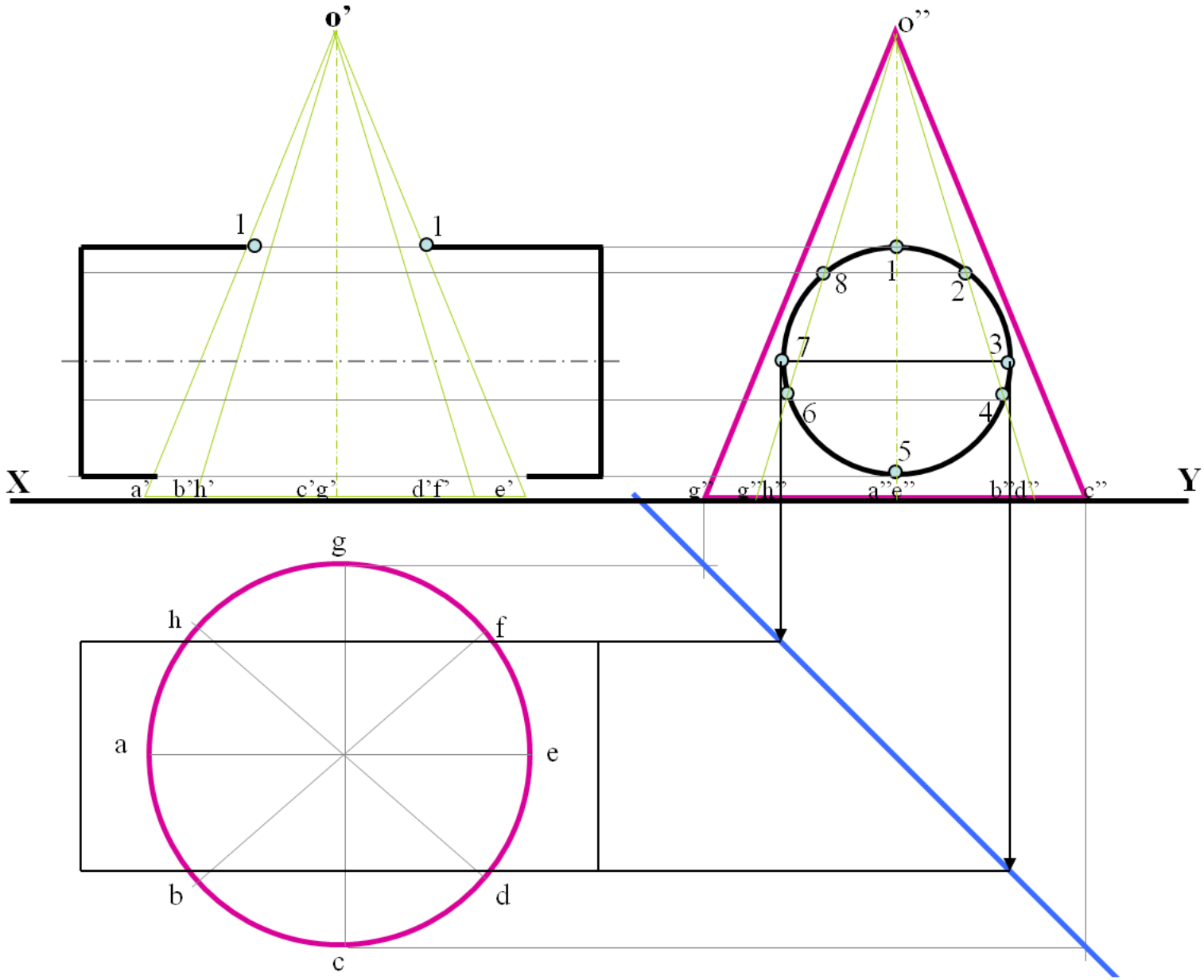
CONE STANDING & CYLINDER PENETRATING

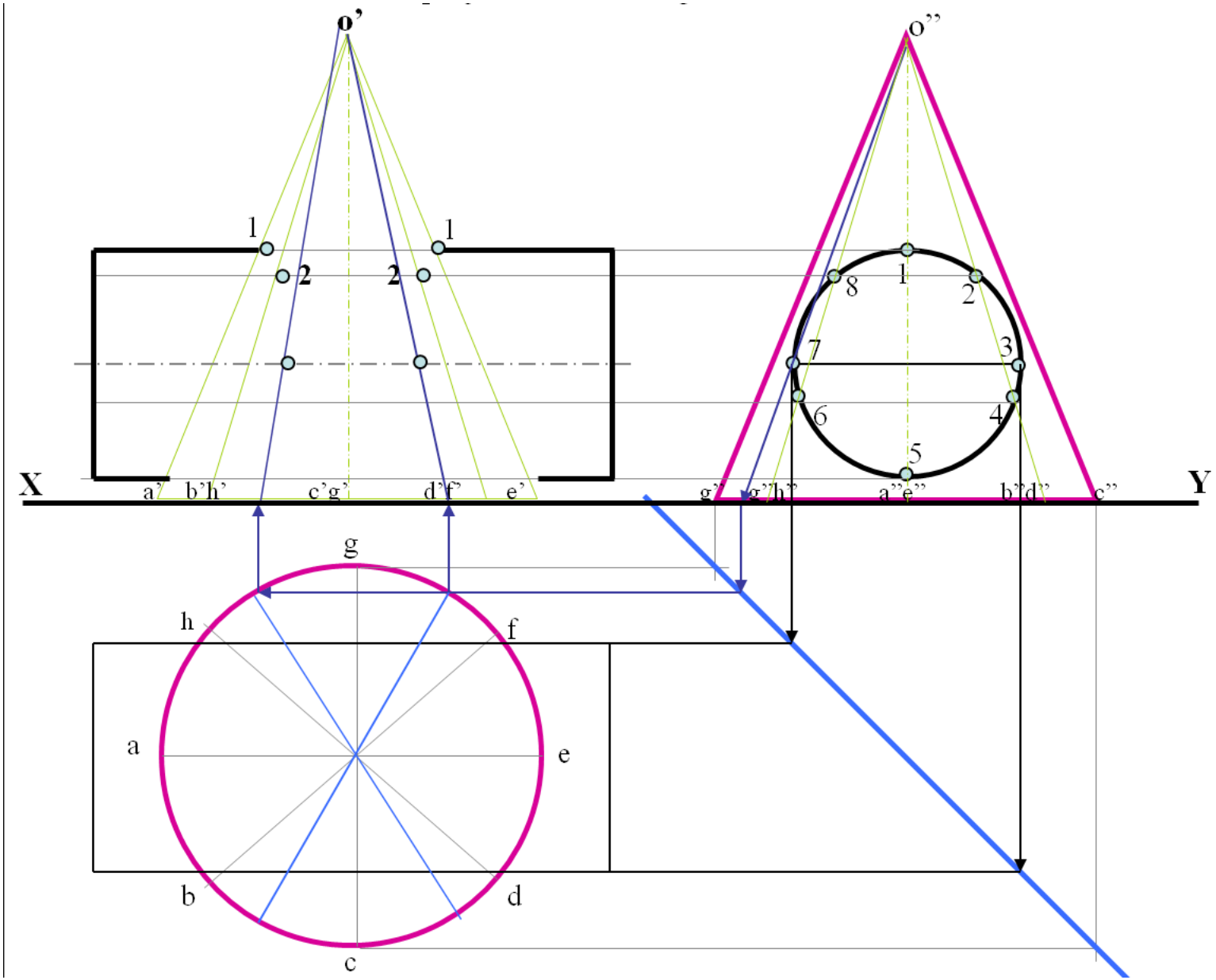
Problem: A vertical cone, base diameter 75 mm and axis 100 mm long, is completely penetrated by a cylinder of 45 mm diameter. The axis of the cylinder is parallel to Hp and Vp and intersects axis of the cone at a point 28 mm above the base. Draw projections showing curves of intersection.

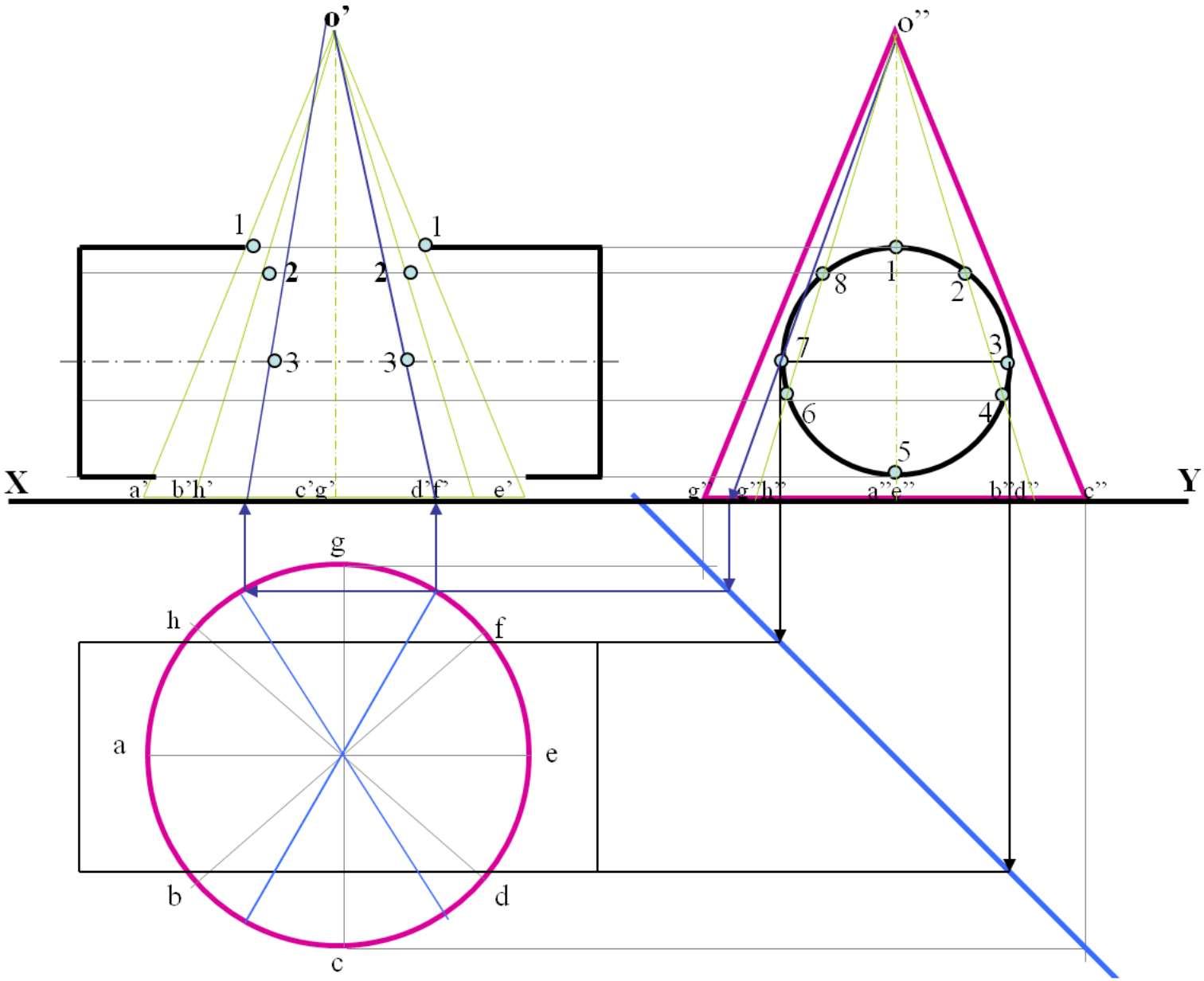


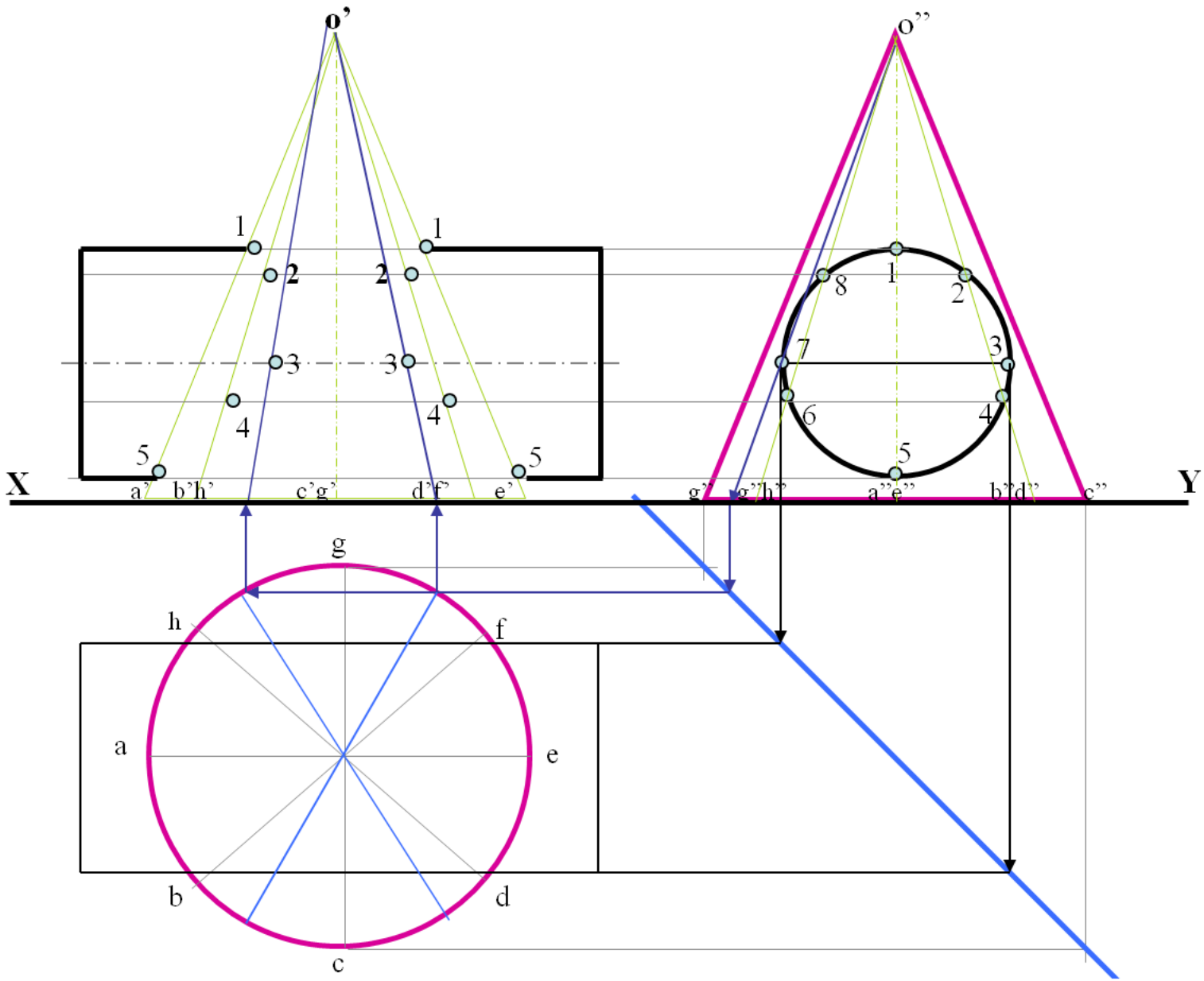

o'
o''
X
Y
a'
b'h'
c'g'
d'f'
e'
g''
g''h''
a''e''
b''d''
c''
1
2
3
4
5
6
7
8
g
h
f
a
e
b
d
c

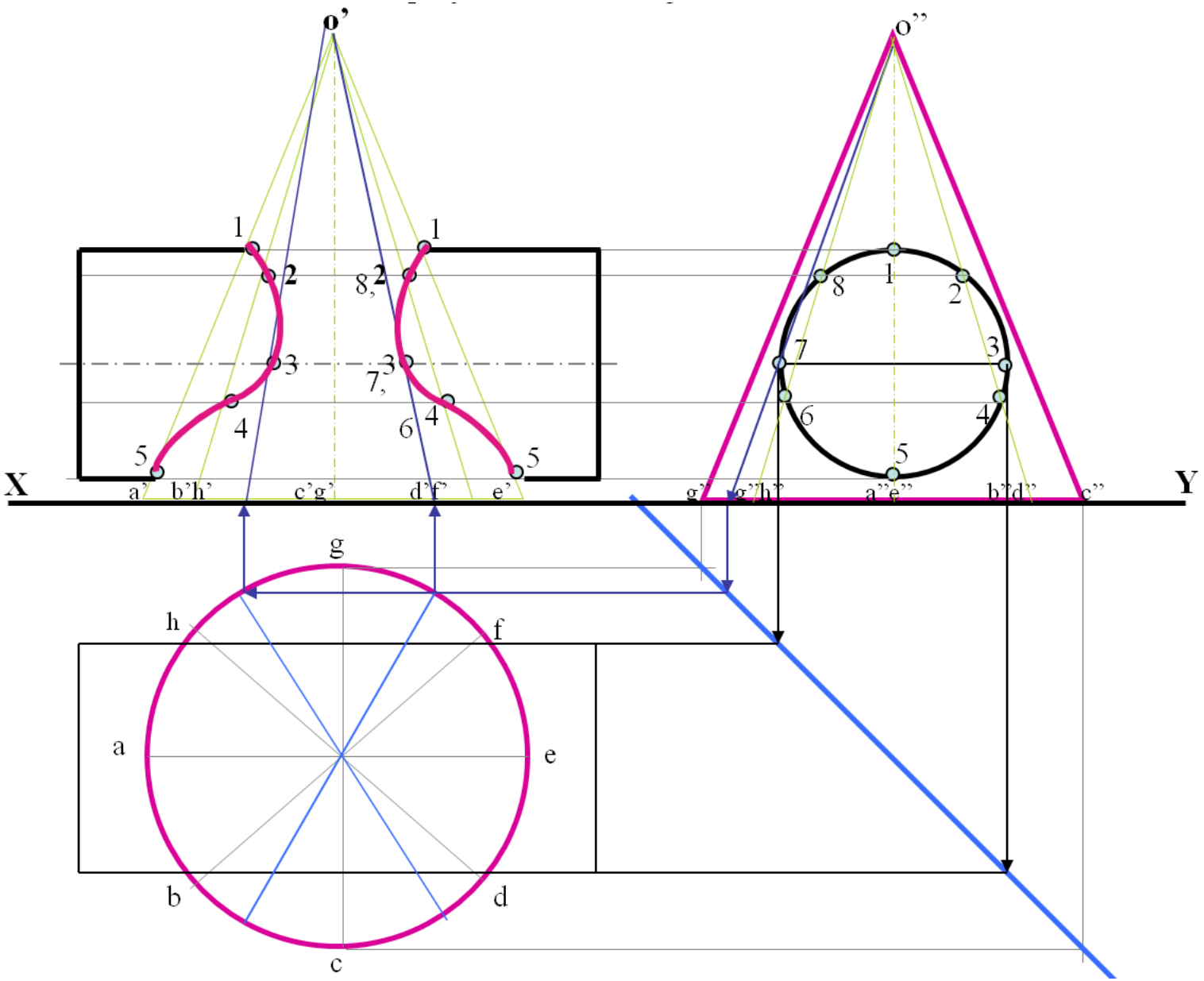

o'
o''
X
Y
a'
b'h'
c'g'
d'f'
e'
g''
g''h''
a''e''
b''d''
c''
1
2
3
4
5
6
7
8
g
h
f
a
e
b
d
c

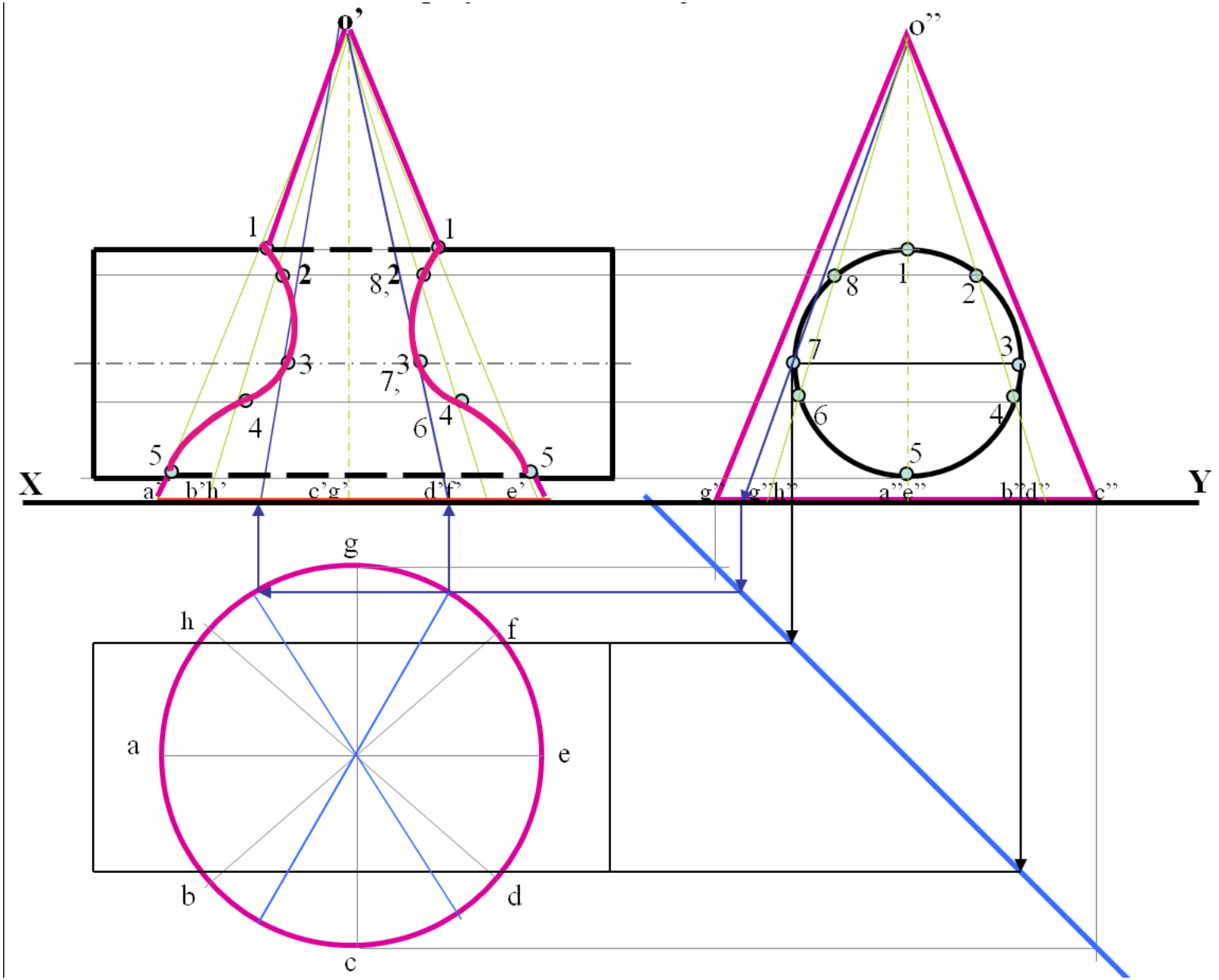

o'
o''
1
1
8
1
2
7
3
6
4
5
X
Y
a'
b'h'
c'g'
d'f'
e'
g''
g''h''
a''e''
b''d''
c''
g
h
f
a
e
b
d
c

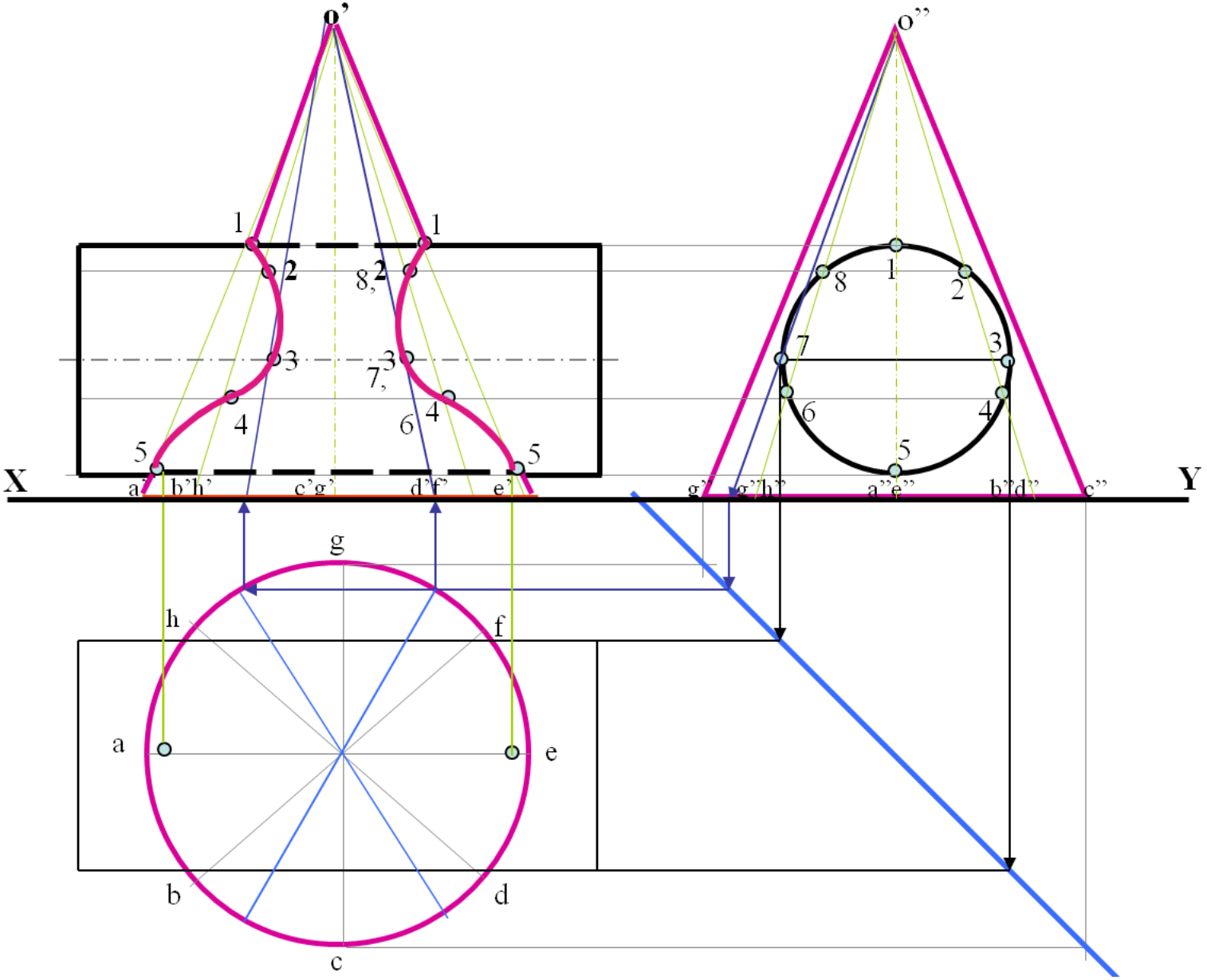

o'
o''
1
1
2
2
8
1
2
7
3
6
4
5
X
Y
a'
b'h'
c'g'
d'f'
e'
g''
g''h''
a''e''
b''d''
c''
g
h
f
a
e
b
d
c

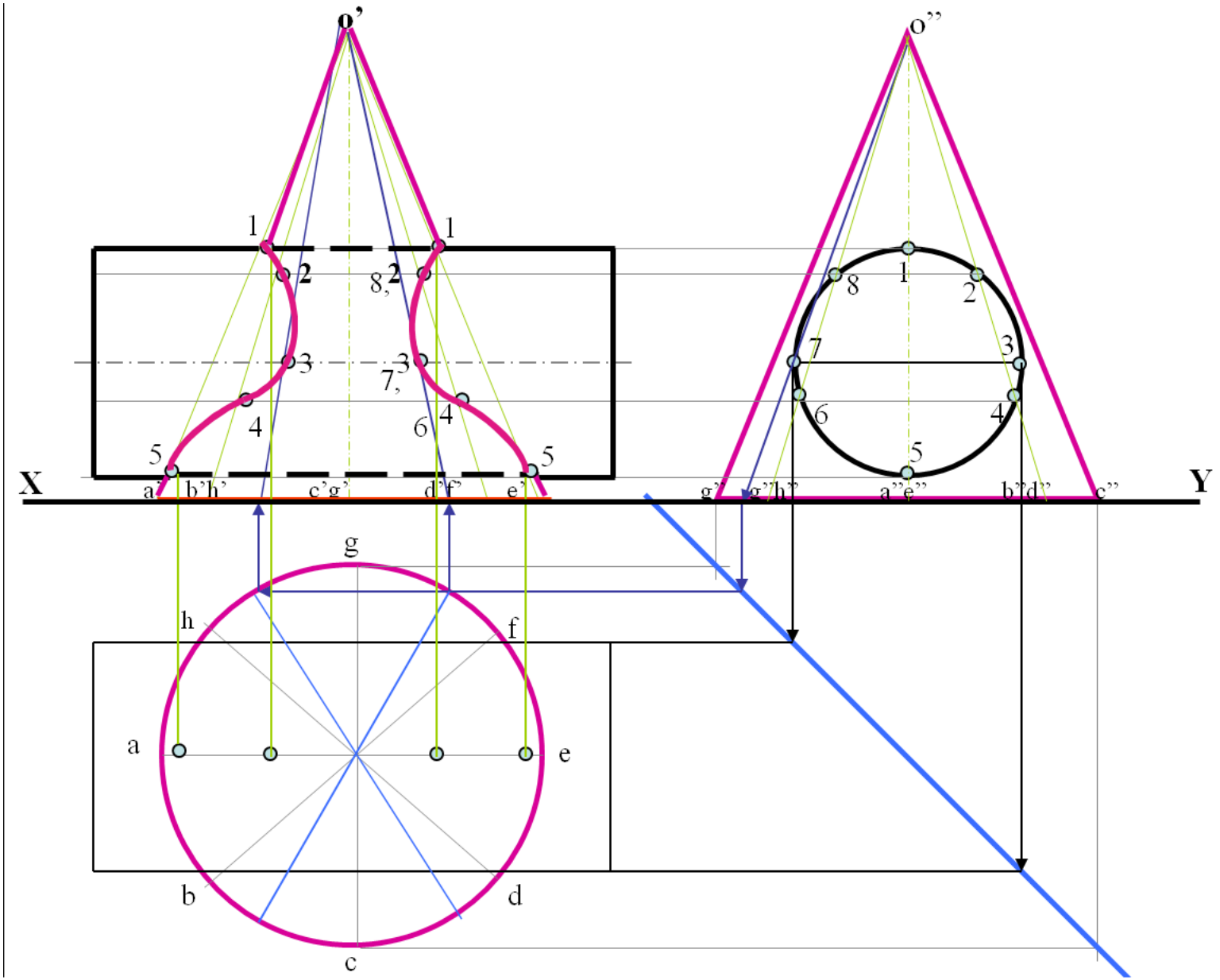

o'
o''
1
1
2
2
3
3
8
1
2
7
3
6
4
5
X
Y
a'
b'h'
c'g'
d'f'
e'
g''
g''h''
a''e''
b''d''
c''
g
h
f
a
e
b
d
c

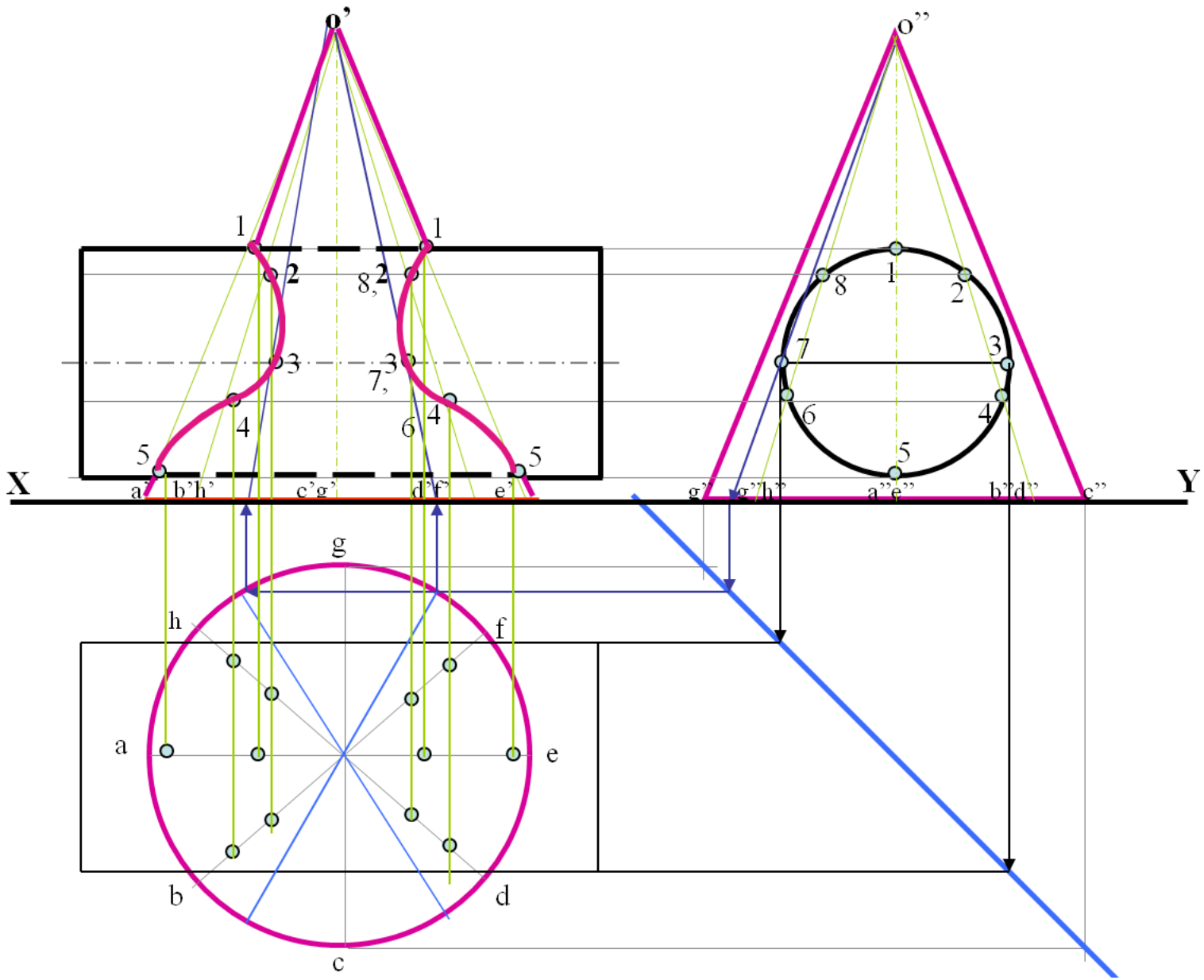

o'
o''
1
2
3
4
5
1
2
3
4
5
X
Y
a'
b'h'
c'g'
d'f'
e'
g''
g''h''
a''e''
b''d''
c''
8
1
2
7
3
6
4
5
g
h
f
a
e
b
d
c

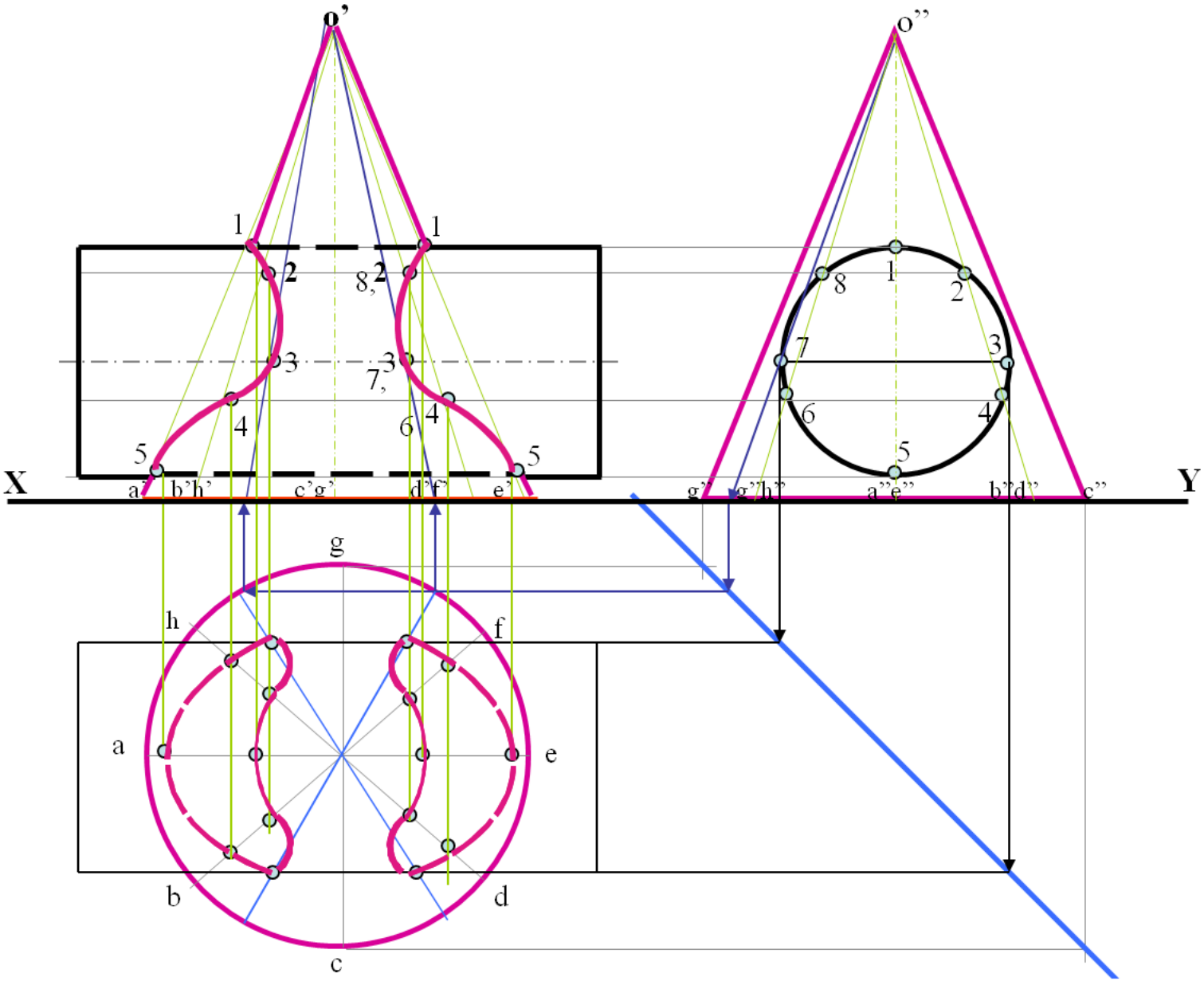

o'
o''
1
2
3
4
5
6
7
8
X
Y
a'
b'h'
c'g'
d'f'
e'
g''
g''h''
a''e''
b''d''
c''
g
h
f
a
e
b
d
c

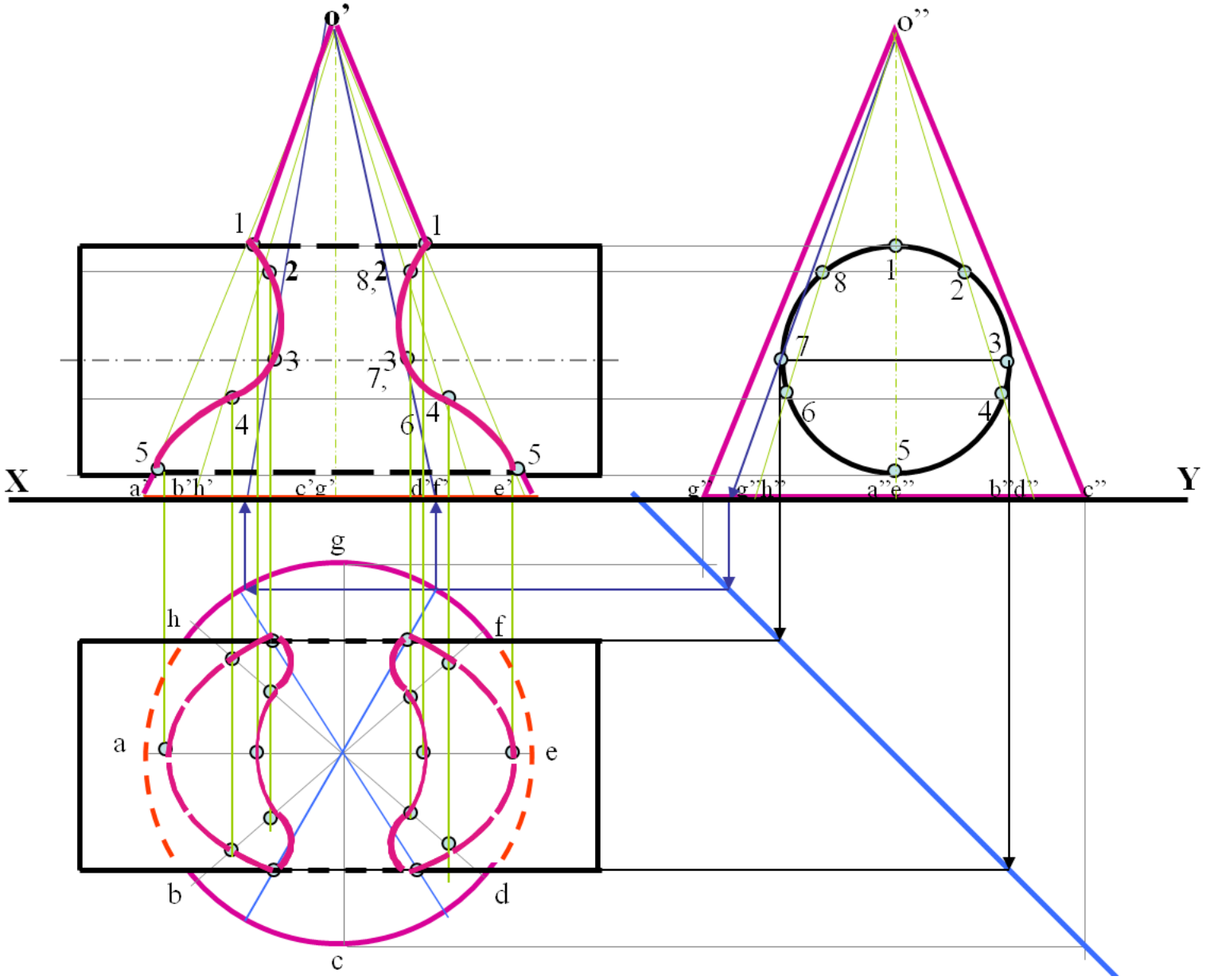

o'
o''
1
1
2
8
2
8
1
2
3
3
7
7
3
4
6
4
6
4
5
5
5
X
Y
a'
b'h'
c'g'
d'f'
e'
g''
g''h''
a''e''
b''d''
c''
g
h
f
a
e
b
d
c

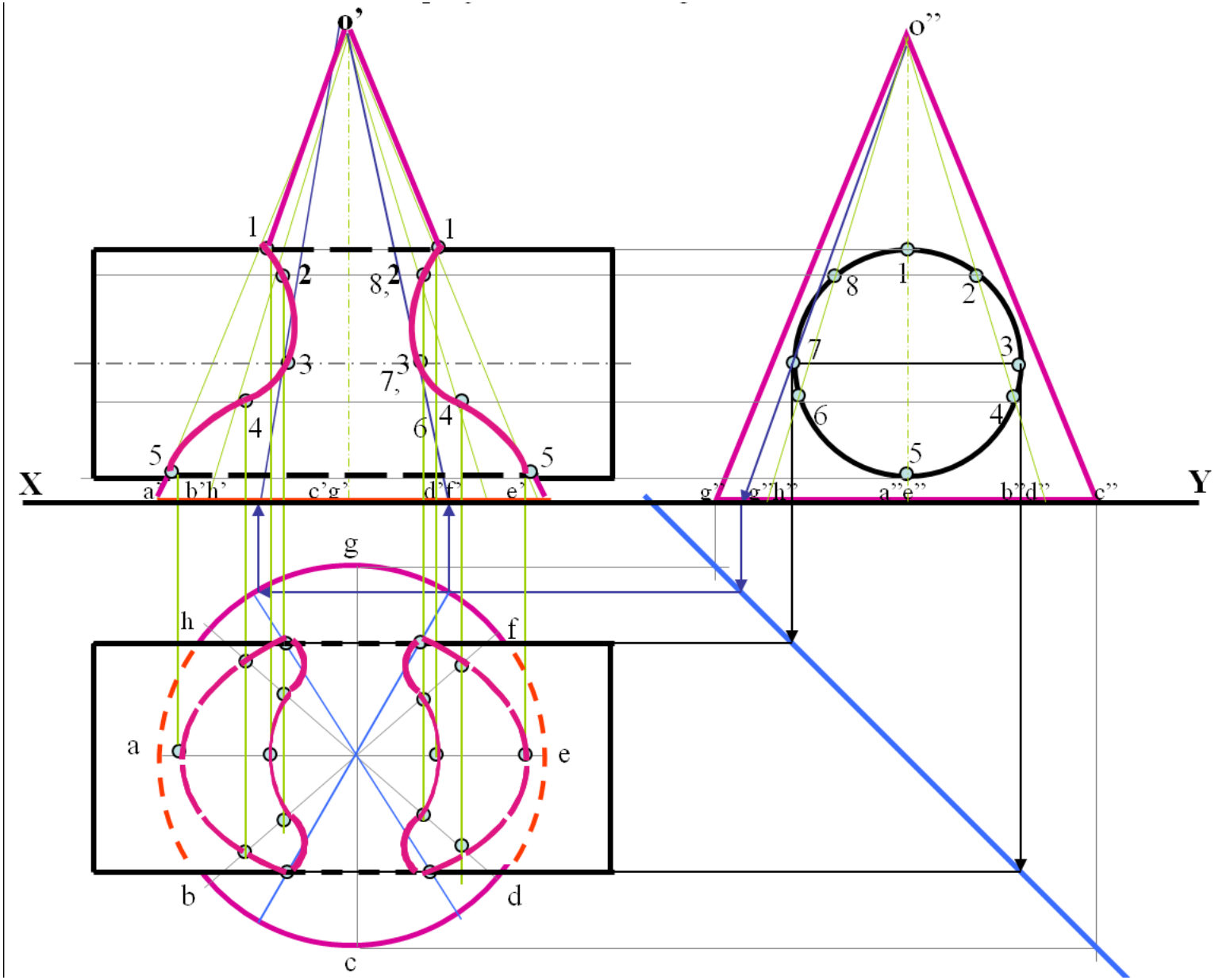

o'
o''
1
1
2
2
8
8
1
2
3
3
7
7
3
4
4
6
6
4
5
5
5
X
Y
a'
b'h'
c'g'
d'f'
e'
g''
g''h''
a''e''
b''d''
c''
g
h
f
a
e
b
d
c


o'
o''
1
1
2
2
8
8
1
2
3
3
7
7
3
4
4
6
6
4
5
5
5
X
Y
a'
b'h'
c'g'
d'f'
e'
g''
g''h''
a''e''
b''d''
c''
g
h
f
a
e
b
d
c


o'
o''
1
2
3
4
5
6
7
8
X
Y
a'
b'h'
c'g'
d'f'
e'
g''
g''h''
a''e''
b''d''
c''
g
h
f
a
e
b
d
c

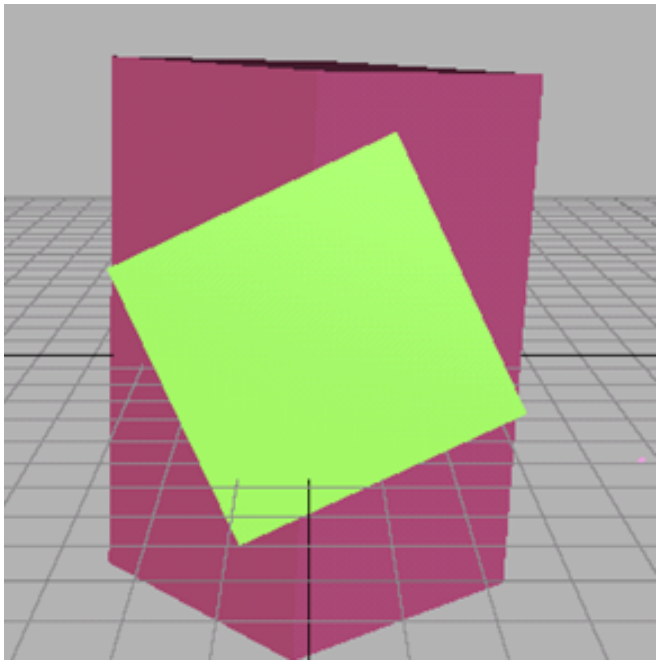

o'
o''
1
1
2
2
8
8
3
3
7
7
4
4
6
6
5
5
X
Y
a'
b'h'
c'g'
d'f'
e'
g''
g''h''
a''e''
b''d''
c''
g
h
f
a
e
b
d
c

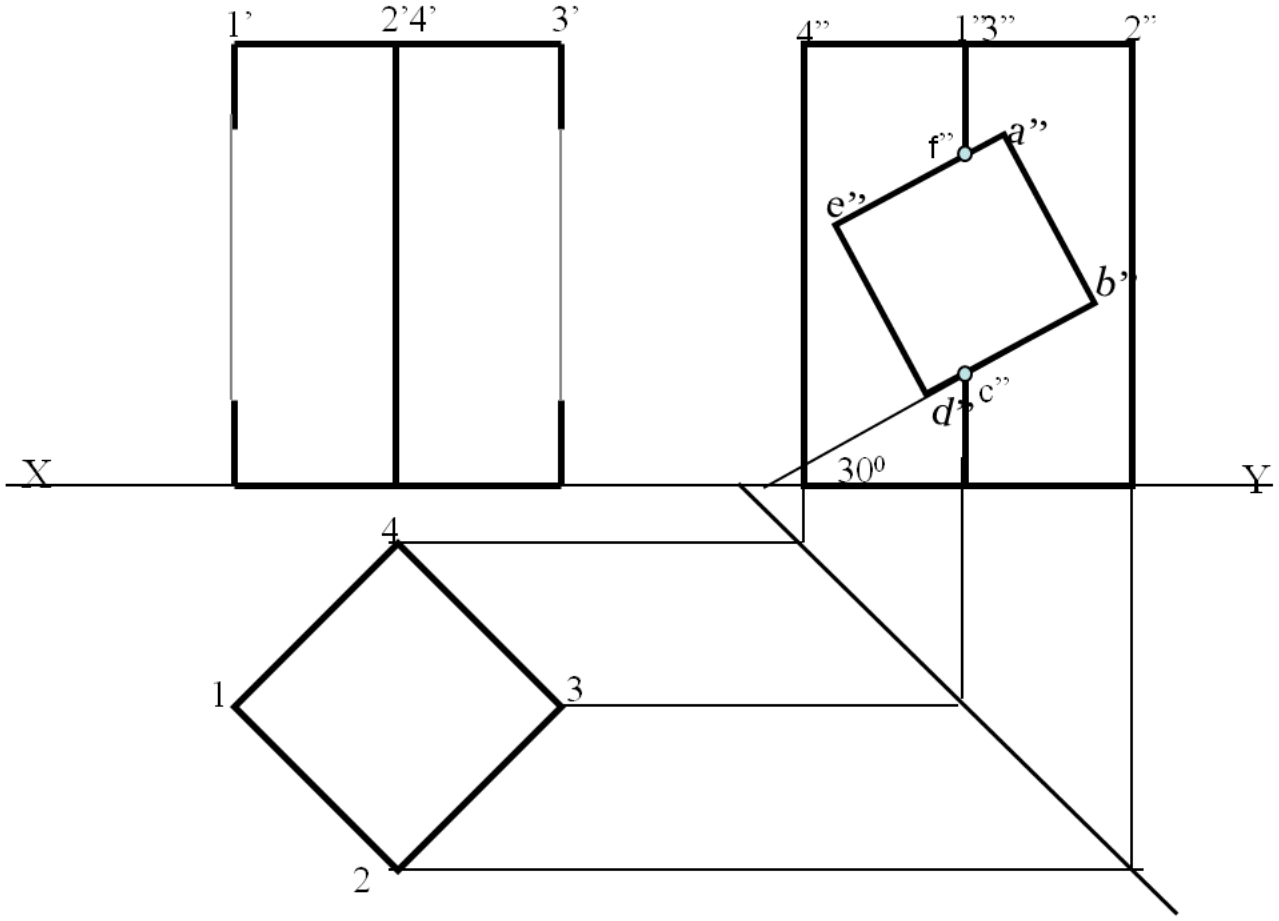

o'
o''
1
1
2
2
8
8
1
2
3
3
7
7
3
6
4
6
4
4
5
5
5
X
Y
a
b'h'
c'g'
d'f'
e'
g''
g''h''
a''e''
b''d''
c''
g
h
f
a
e
b
d
c

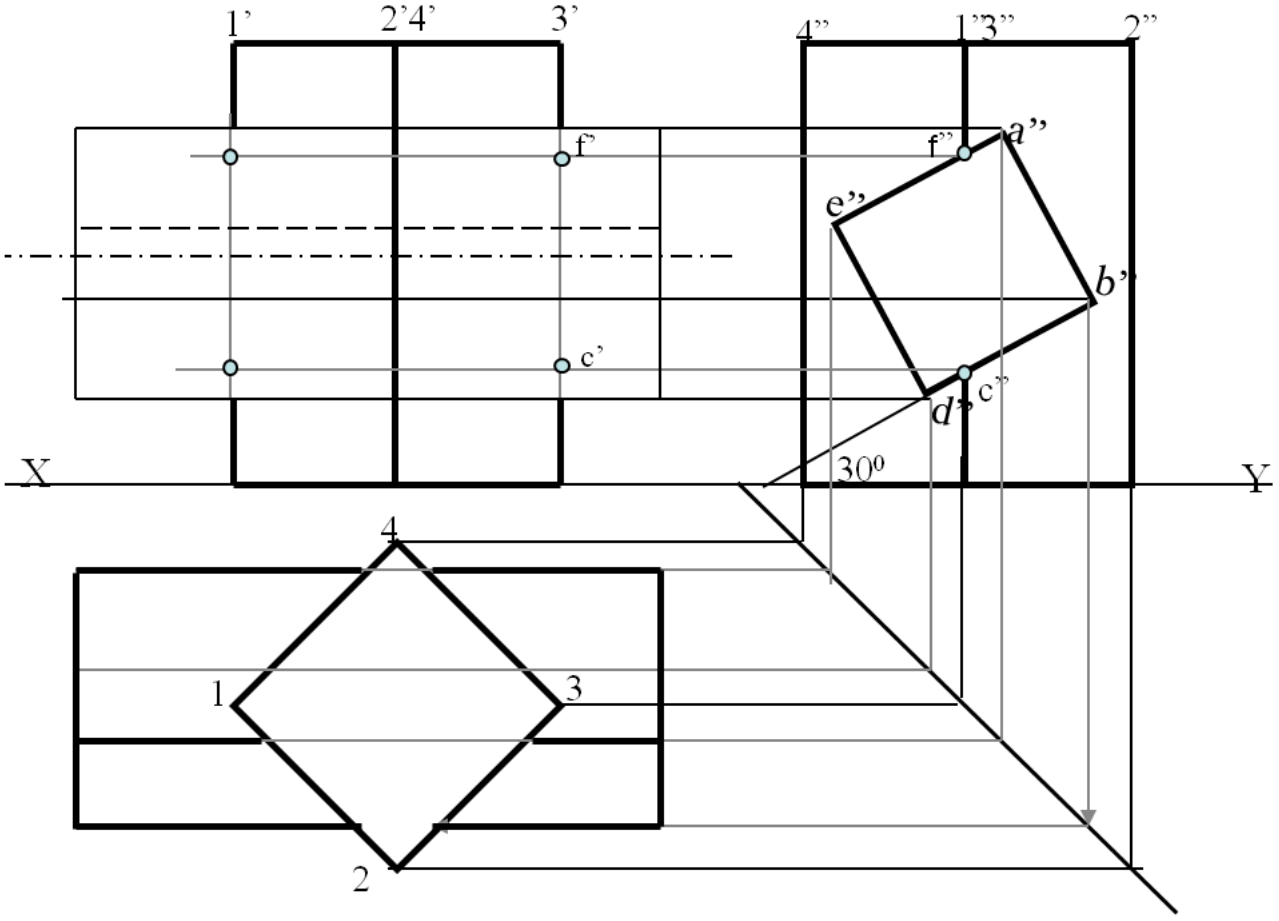

o'
o''
1
1
2
8
2
8
1
2
3
3
7
7
3
4
6
4
6
4
5
5
5
X
Y
a'
b'h'
c'g'
d'f'
e'
g''
g''h''
a''e''
b''d''
c''
g
h
f
a
e
b
d
c

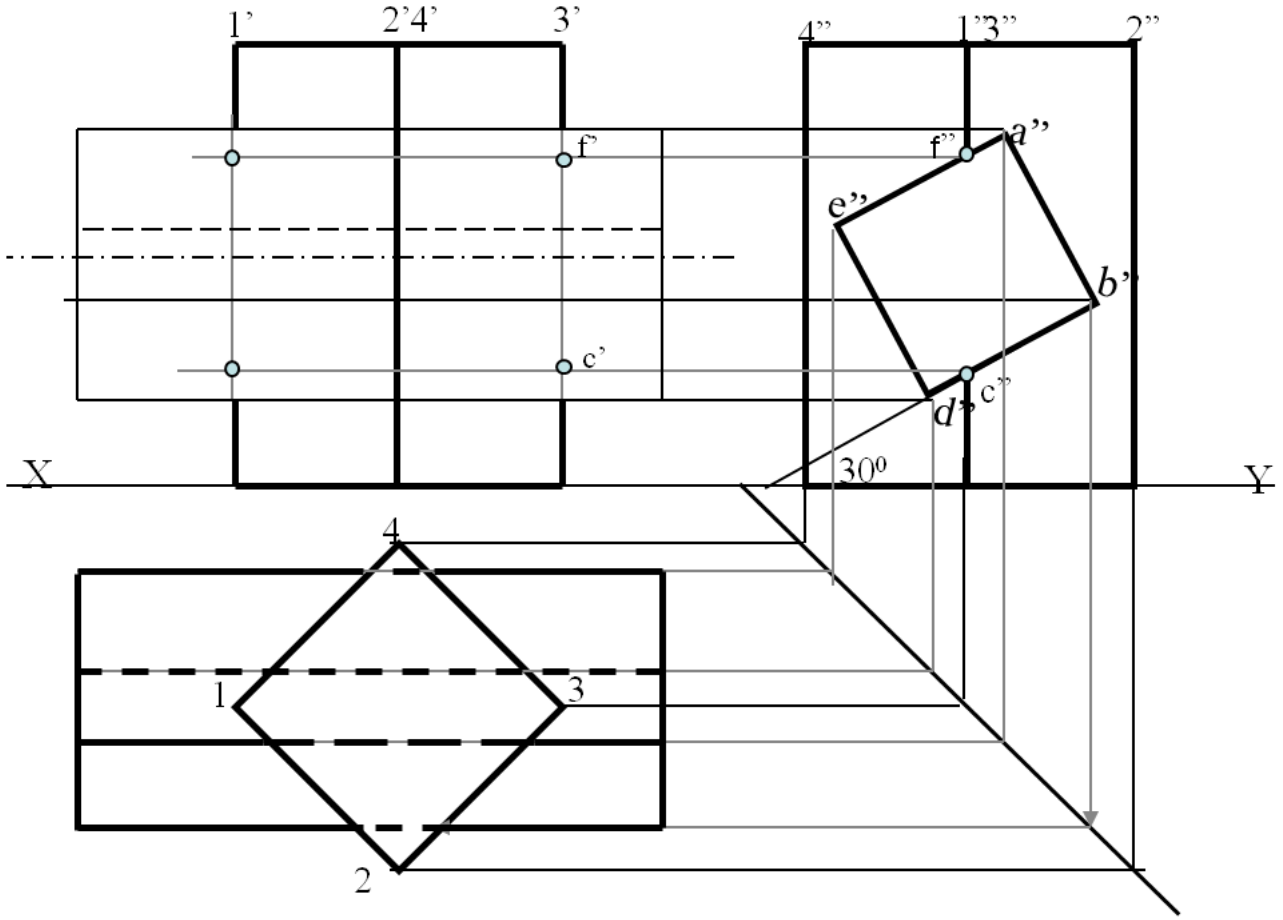
SQ.PRISM STANDING & SQ.PRISM PENETRATING

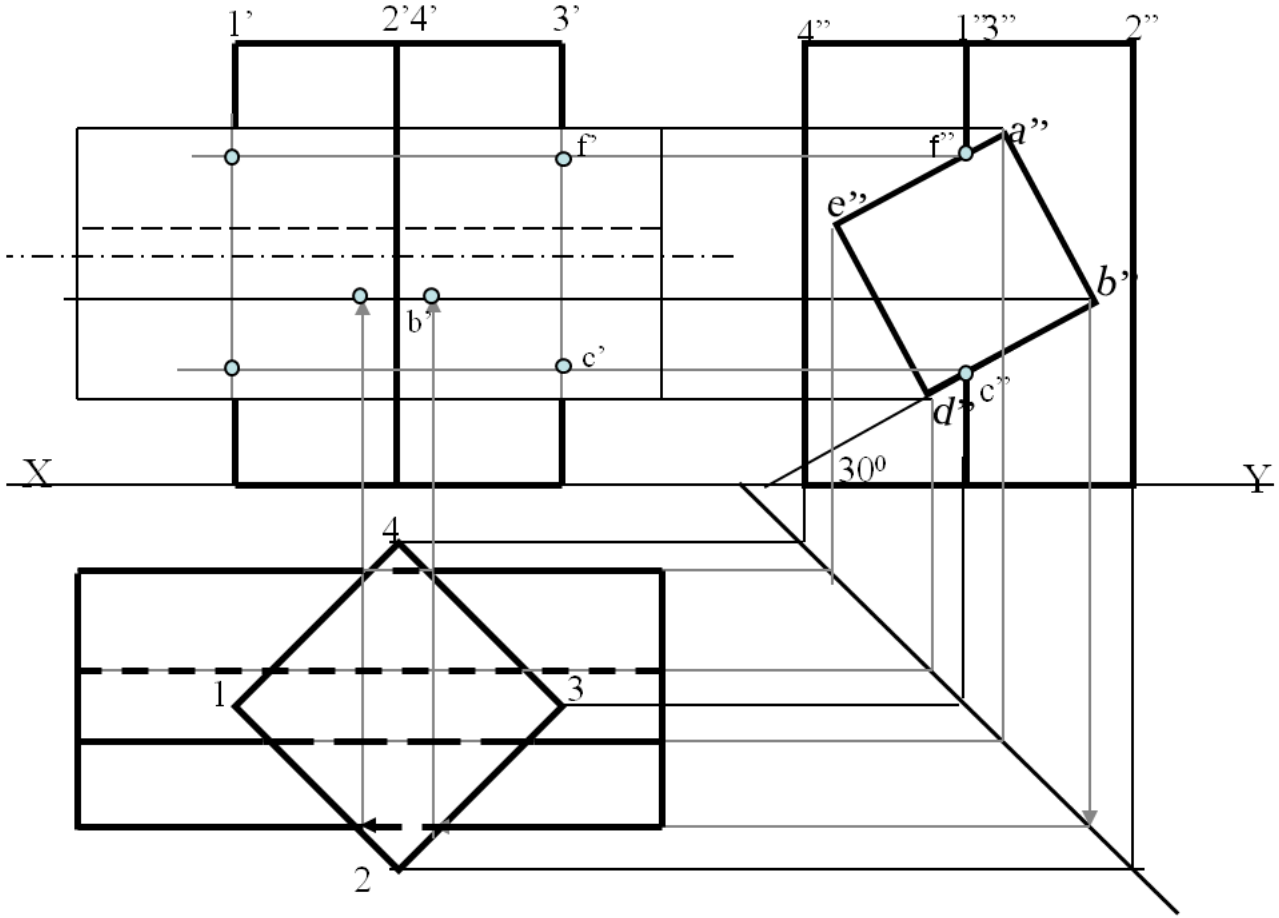
Problem: A sq. prism 30 mm base sides and 70mm axis is completely penetrated by another square prism of 25 mm sides and 70 mm axis, horizontally. Both axes Intersect & bisect each other Two faces of penetrating prism are 300 inclined to Hp. Draw projections showing curves of intersections

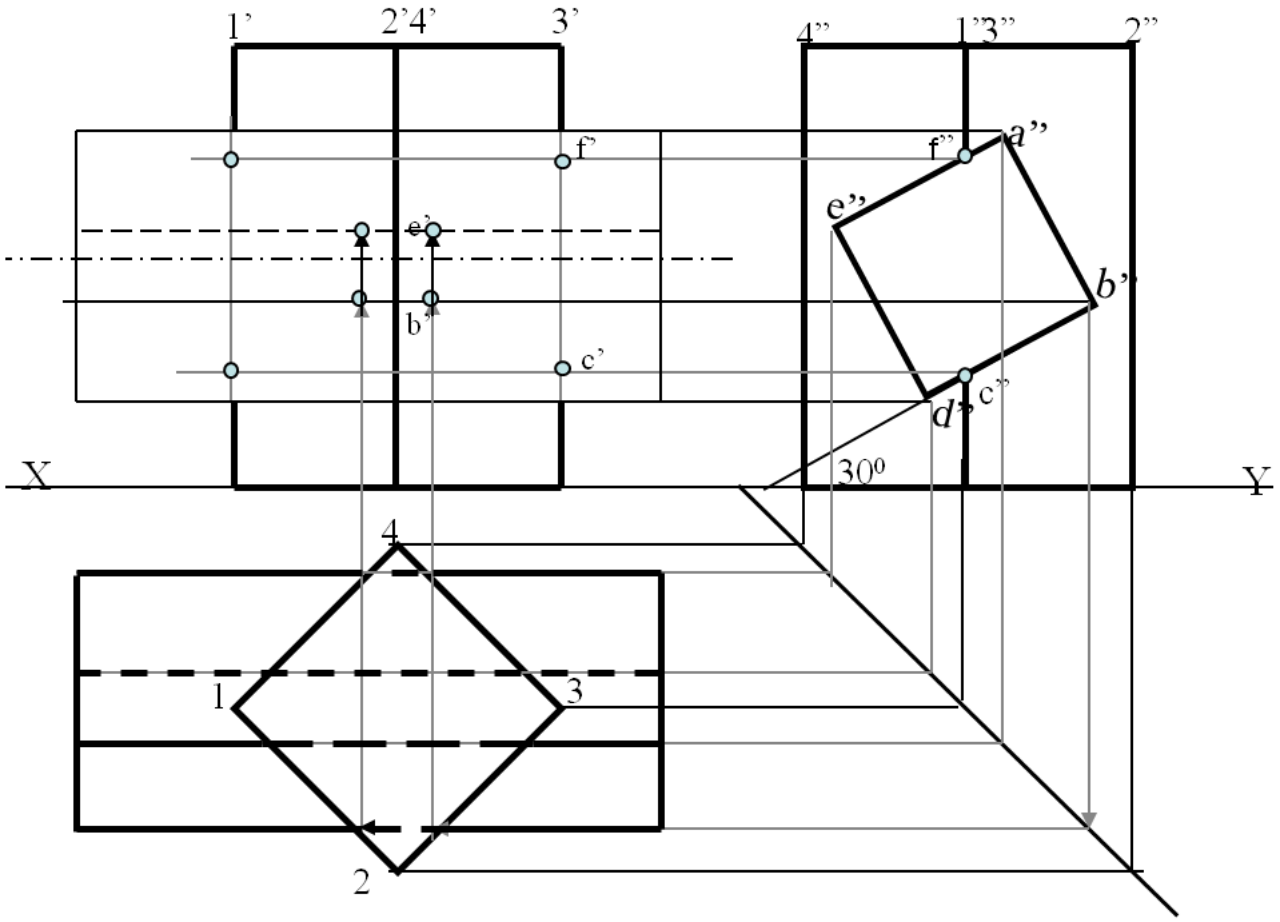


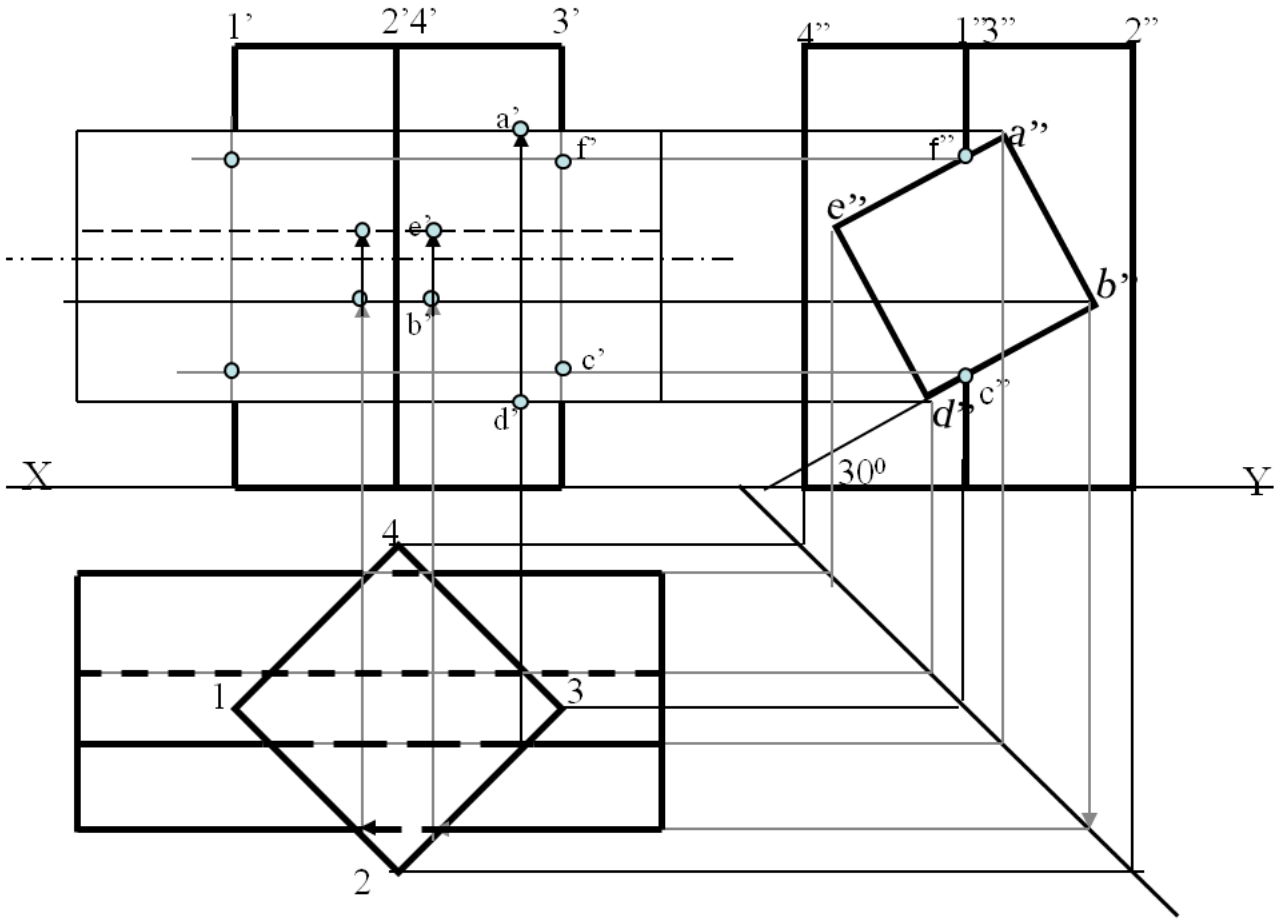

1’
2’4’
3’
4”
1”3”
2”
f”
a”
e”
b’
c”
d’
X
30⁰
Y
4
1
3
2

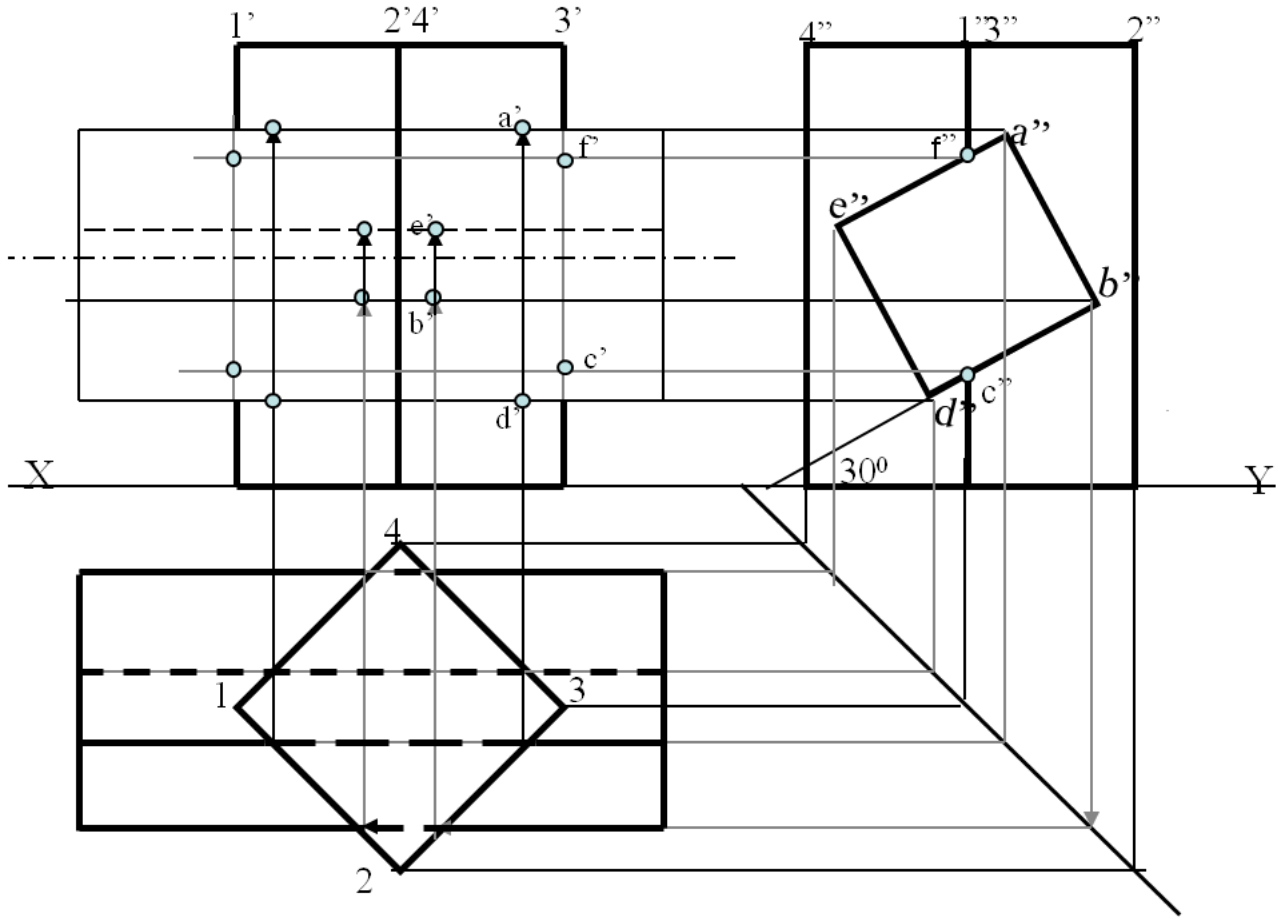

1’
2’4’
3’
4”
1”3”
2”
f”
f”
a”
e”
b’
c’
c”
d”
X
30⁰
Y
4
1
3
2

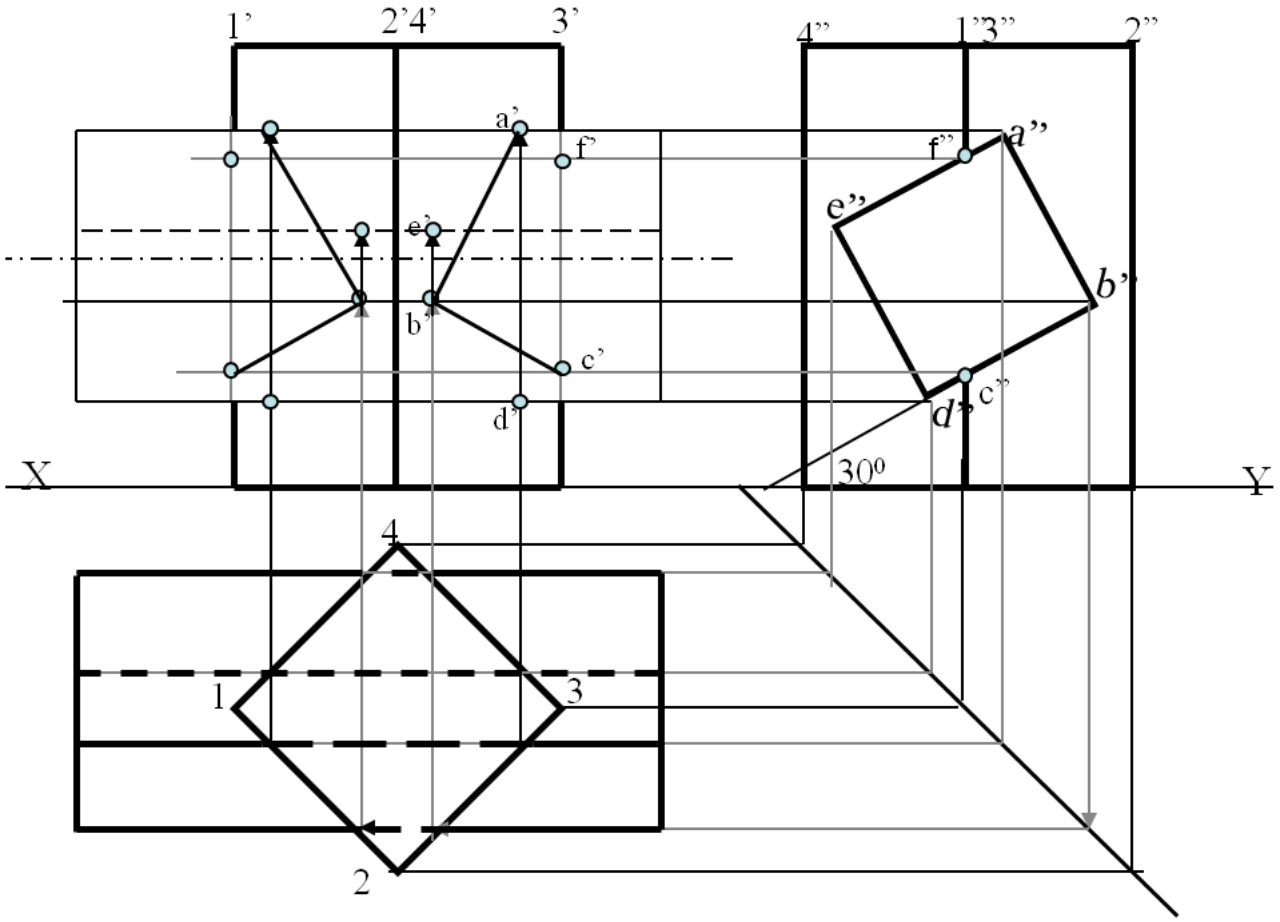

1’
2’4’
3’
4”
1”3”
2”
f’
f”
a”
e”
b’
c’
c”
d’
X
30⁰
Y
4
1
3
2

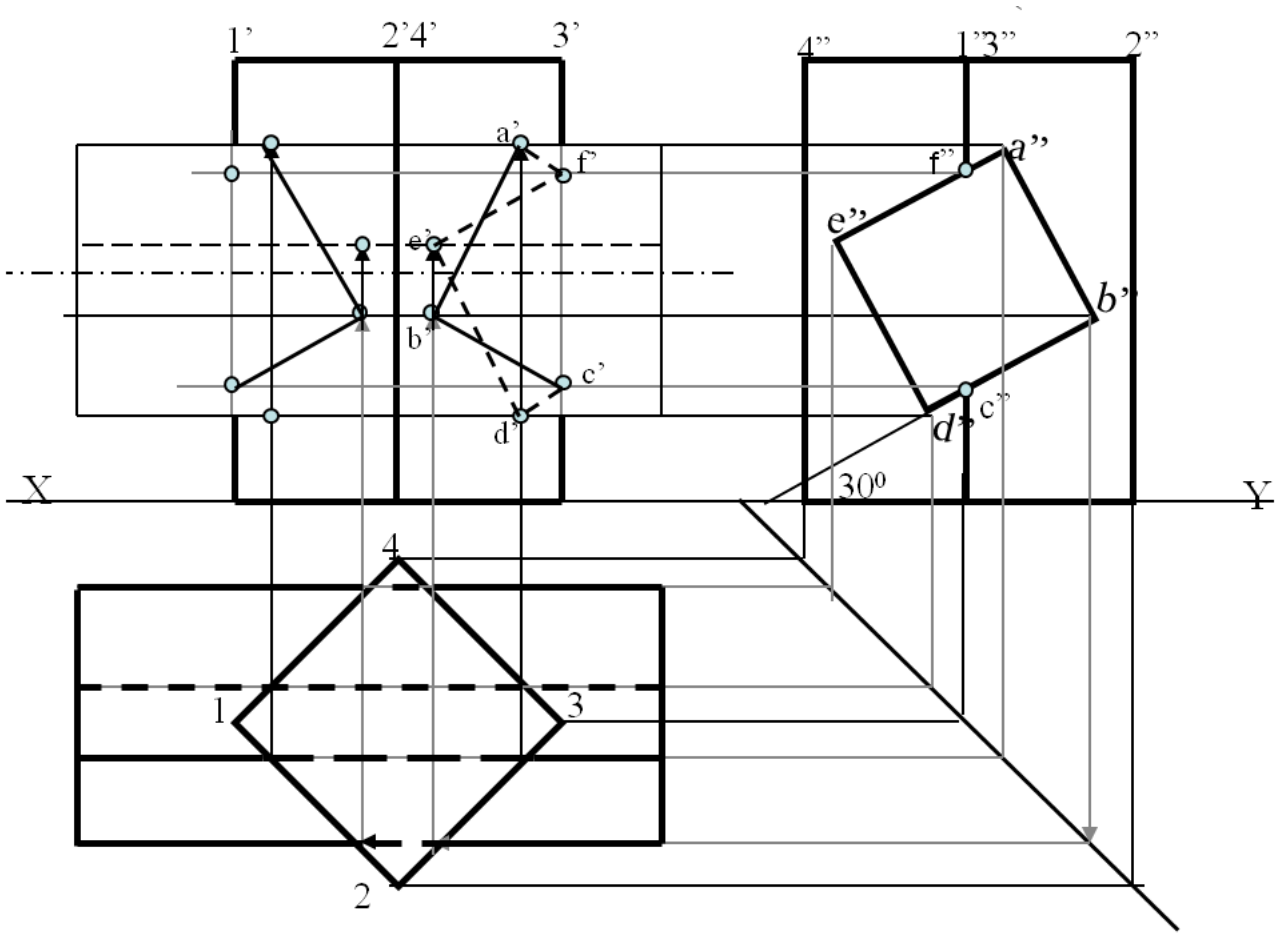

1’
2’4’
3’
4”
1”3”
2”
f’
f”
a”
e”
b”
b’
c’
c”
d”
X
Y
30⁰
4
1
3
2

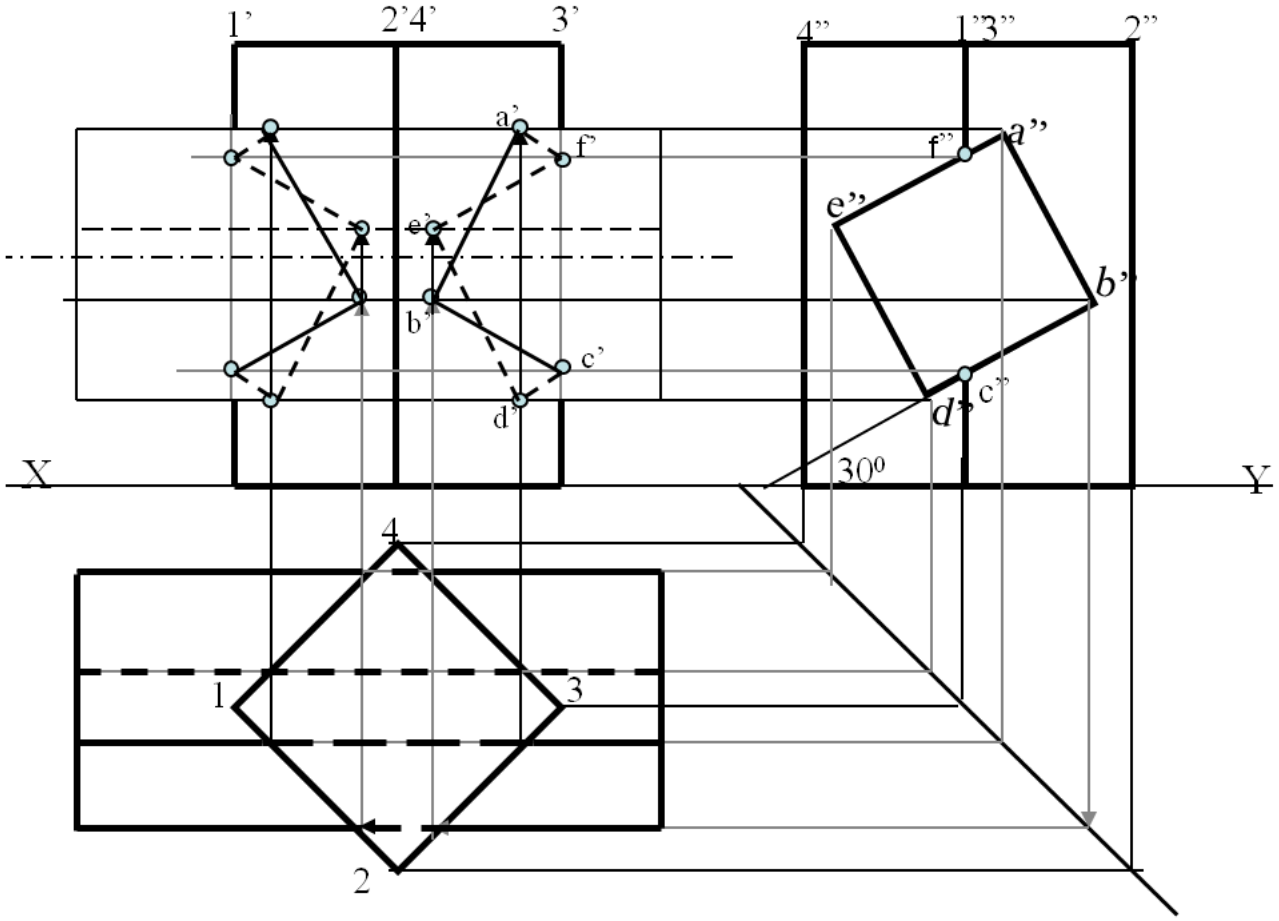

1’
2’4’
3’
4”
1”3”
2”
f’
f”
a”
e’
e”
b”
b’
c’
c”
d”
X
30⁰
Y
4
1
3
2

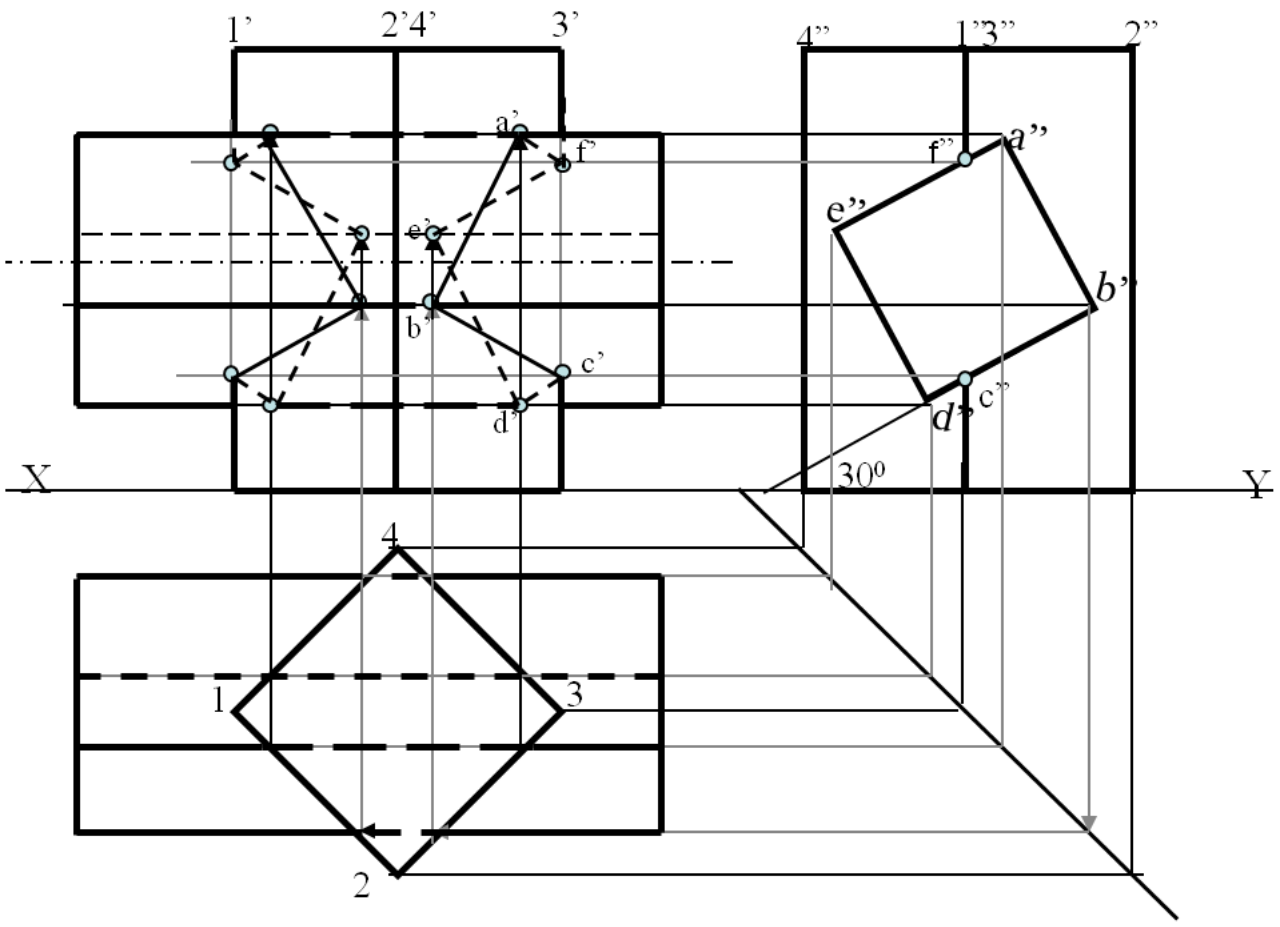

1'
2'4'
3'
4"
1"3"
2"
a'
f'
e'
b'
c'
d'
a"
f"
e"
b'
c"
d"
30⁰
X
Y
4
1
3
2

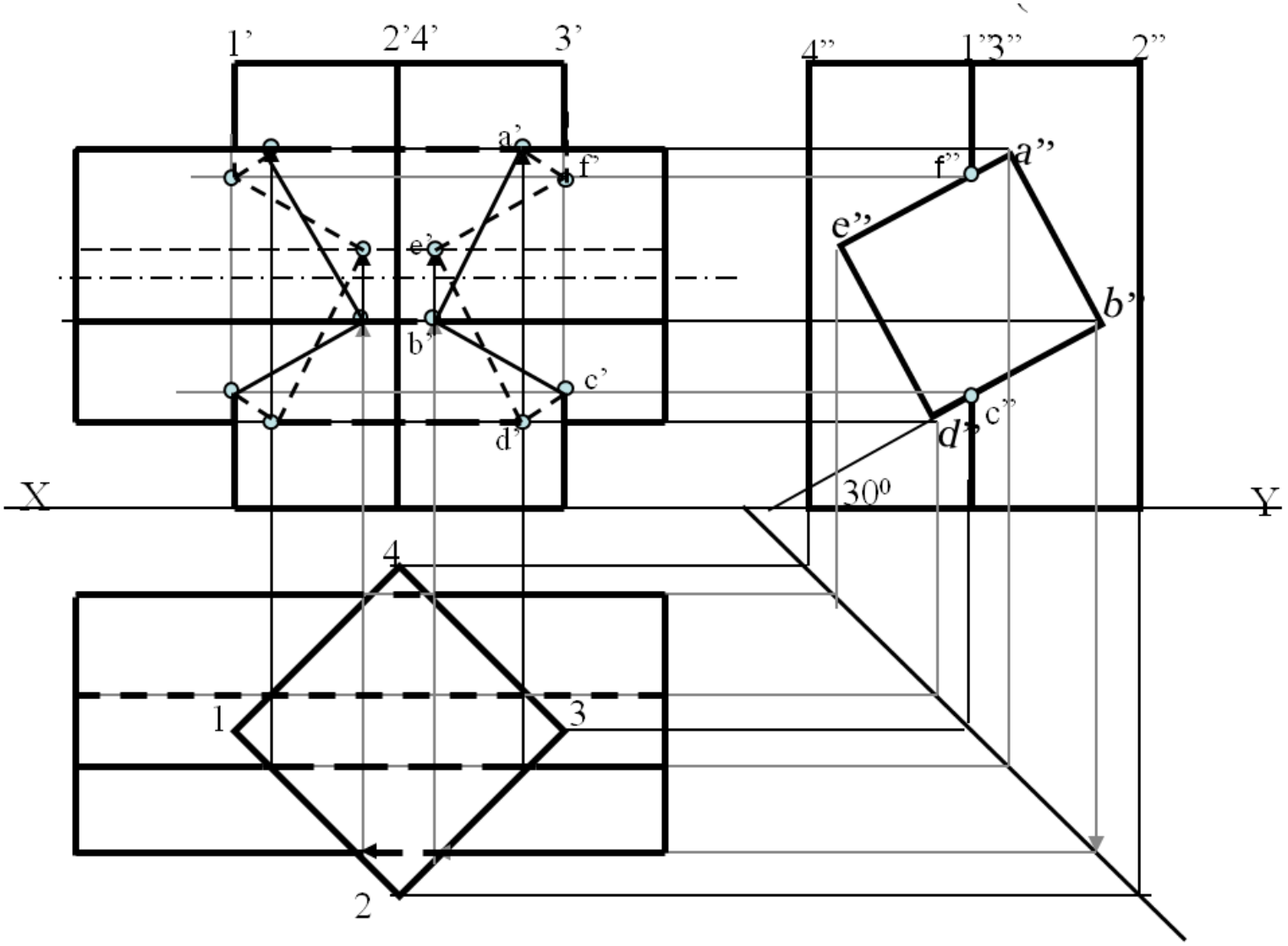

1’
2’4’
3’
4”
1”3”
2”
a’
f’
e’
b’
c’
d’
a”
f”
e”
b”
c”
d”
X
Y
30⁰
4
1
3
2


1’
2’4’
3’
4”
1”3”
2”
a’
f’
e’
b’
c’
d’
f”
a”
e”
b”
c”
d”
X
Y
30⁰
4
1
3
2


1’
2’4’
3’
4”
1”3”
2”
a’
f’
e’
b’
c’
d’
a”
f”
e”
b’
c”
d”
30⁰
X
Y
4
1
3
2


1’
2’4’
3’
4”
1”3”
2”
a’
f”
a”
f”
e”
e’
b”
b’
c’
d’
c”
d”
X
30⁰
Y
4
1
3
2


1’
2’4’
3’
4”
1”3”
2”
a’
f’
e’
b’
c’
d’
a”
f”
e”
b”
c”
d”
X
Y
30⁰
4
1
3
2


1’
2’4’
3’
4”
1”3”
2”
a’
f’
e’
b’
c’
d’
a”
f”
e”
b”
c”
d”
X
Y
30⁰
4
1
3
2