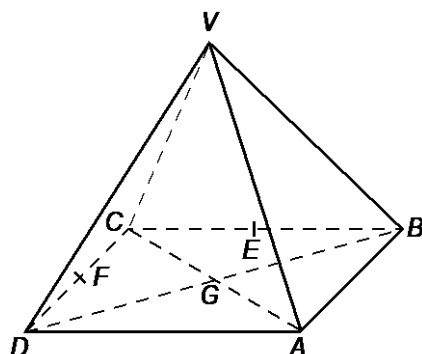


F.6 Mathematics

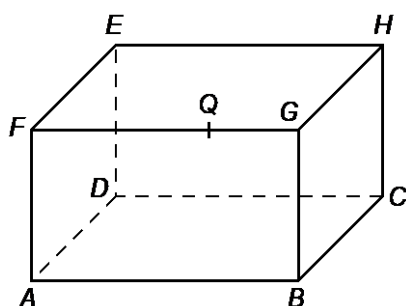
MC Exercise

6-3 Applications of Trigonometry in 3D Problems

1. In the figure, $VABCD$ is a right pyramid with a square base. E and F are the mid-points of BC and CD respectively. AC and BD intersect at G . Which of the following is the angle between VC and plane $ABCD$?

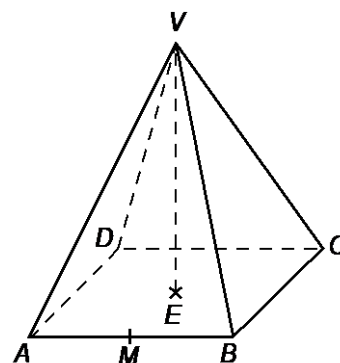


- A. $\angle BCD$
 B. $\angle VCE$
 C. $\angle VCF$
 D. $\angle VCG$
2. In the figure, $ABCDEFGH$ is a cuboid. Q is a point lying on FG . The angle between planes ADQ and BCQ is



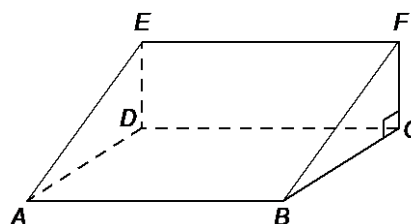
- A. $\angle AQB$.
 B. $\angle DQC$.
 C. $\angle EQH$.
 D. $\angle AQC$.

3. In the figure, $VABCD$ is a right rectangular pyramid with VE as its height. M is the mid-point of AB .



Which of the following is **NOT** correct?

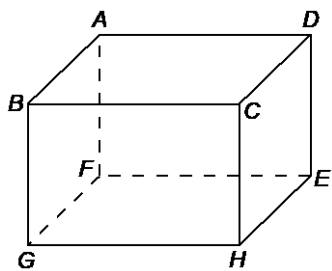
- A. $\angle AEV = 90^\circ$
 B. The projection of V on plane $ABCD$ is E .
 C. The projection of VM on plane $ABCD$ is EM .
 D. The angle between planes VAB and $ABCD$ is $\angle MVE$.
4. The figure shows a right triangular prism $ABCDEF$.



Which of the following must be correct?

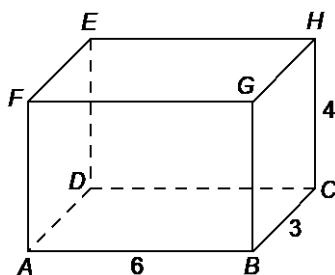
- I. $\tan \angle FBC = \frac{CB}{CF}$
 II. The projection of BE on plane $ABCD$ is DE .
 III. $\angle EAD$ is an angle between planes $ABFE$ and $ABCD$.
- A. I only
 B. III only
 C. I and II only
 D. II and III only

5. In the figure, $ABCDEFGH$ is a cuboid. If $AB < BC$, which of the following makes the least angle with plane $EFGH$?



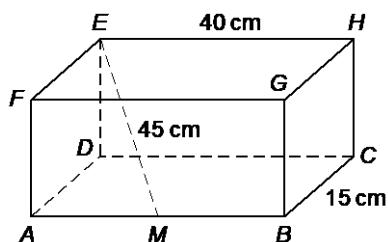
- A. GA
B. GB
C. GC
D. GD

6. In the figure, $ABCDEFGH$ is a cuboid, where $AB=6$, $BC=3$ and $CH=4$. Find the angle between AH and plane $BCHG$ correct to 3 significant figures.



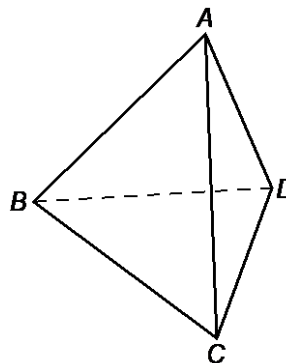
- A. 30.8°
B. 39.8°
C. 50.2°
D. 63.4°

7. In the figure, $ABCDEFGH$ is a cuboid. M is the mid-point of AB . It is given that $BC=15\text{ cm}$, $EH=40\text{ cm}$ and $EM=45\text{ cm}$. Find the angle between EM and plane $ABCD$ correct to the nearest degree.



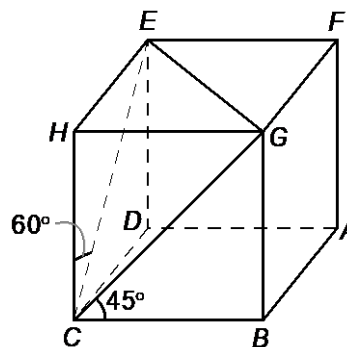
- A. 18°
B. 34°
C. 56°
D. 63°

8. In the figure, $ABCD$ is a regular tetrahedron. Find the angle between AB and plane ADC .



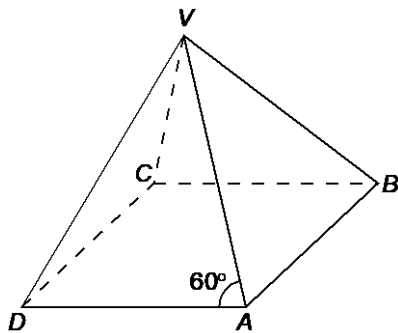
- A. 54.7° (corr. to 3 sig. fig.)
B. 60°
C. 62.6° (corr. to 3 sig. fig.)
D. 70.5° (corr. to 3 sig. fig.)

9. In the figure, $ABCDEFGH$ is a cuboid. Find $\angle CEG$ correct to the nearest degree.

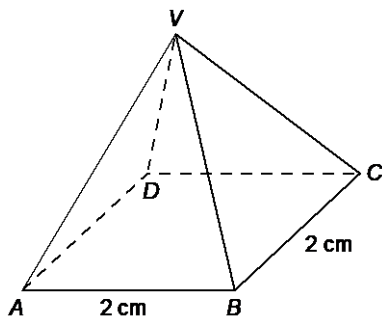


- A. 41°
B. 52°
C. 69°
D. 76°

10. In the figure, $VABCD$ is a right square pyramid, where $\angle VAD = 60^\circ$. Find the angle between VD and plane $ABCD$.

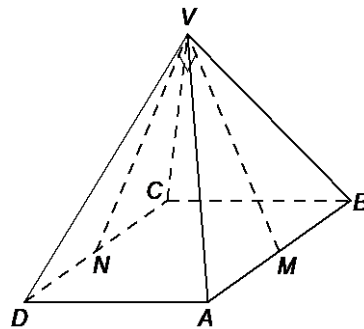


- A. 30°
 B. 45°
 C. 60°
 D. 90°
11. In the figure, $VABCD$ is a right pyramid of height 2 cm, where its base $ABCD$ is a square with sides of 2 cm each. If the angle between planes VAB and VCD is θ , find $\tan \theta$.

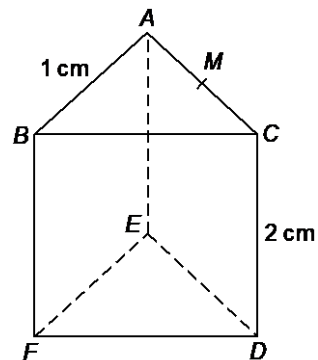


- A. 1
 B. $\frac{4}{3}$
 C. $2\sqrt{3}$
 D. 4

12. In the figure, $VABCD$ is a right pyramid with a square base. M and N are the mid-points of AB and DC respectively. If $\angle MVN = 90^\circ$, find $\angle VMD$ correct to 3 significant figures.



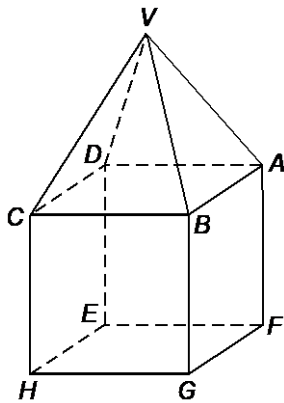
- A. 35.3°
 B. 39.2°
 C. 50.8°
 D. 54.7°
13. In the figure, $ABCDEF$ is a right triangular prism, where $\triangle ABC$ is an equilateral triangle of side 1 cm. The height of the prism is 2 cm. M is the mid-point of AC .



Which of the following angles is the largest?

- A. $\angle FAD$
 B. $\angle FED$
 C. $\angle FAB$
 D. $\angle FMB$

14. In the figure, a solid is formed by a cube $ABCDEFGH$ and a right square pyramid $VABCD$ with all sides equal.

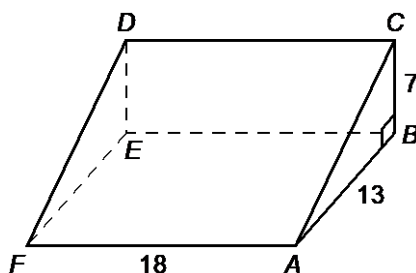


Which of the following must be right angle(s)?

- I. $\angle EFB$
- II. $\angle VBE$
- III. $\angle BFD$

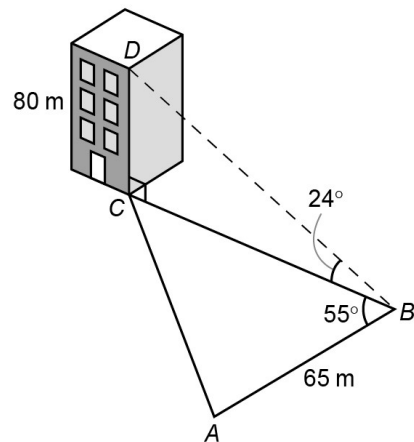
- A. I only
- B. III only
- C. I and II only
- D. II and III only

15. In the figure, $ABEF$ is a rectangular horizontal plane and $ACDF$ is a rectangular inclined plane, where C and D are vertically above B and E respectively. It is given that $AF=18$, $AB=13$ and $BC=7$. Find the inclination of CF correct to 1 decimal place.



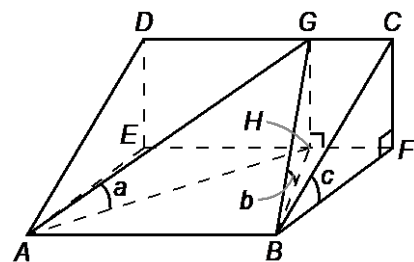
- A. 16.7°
- B. 17.5°
- C. 19.4°
- D. 28.3°

16. In the figure, ABC is a horizontal plane and CD is a building of height 80 m standing vertically on C . The angle of elevation of D from B is 24° , $\angle ABC=55^\circ$ and $AB=65$ m. Find the length of AC correct to 3 significant figures.



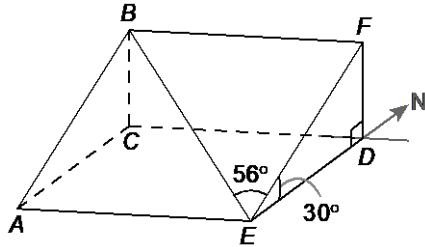
- A. 132 m
- B. 152 m
- C. 172 m
- D. 179 m

17. In the figure, $ABFE$ is a rectangular horizontal plane and $ABCD$ is a rectangular inclined plane, where D and C are vertically above E and F respectively. G and H are points lying on DC and EF respectively such that $GH \perp EF$. It is given that $EH > HF$. If $\angle GAH = a$, $\angle GBH = b$ and $\angle CBF = c$, which of the following must be true?

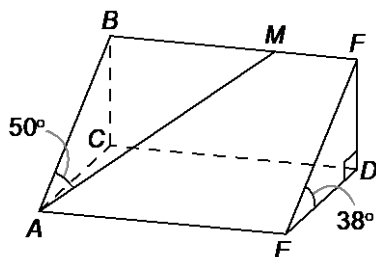


- A. $a > b > c$
- B. $b > a > c$
- C. $b > c > a$
- D. $c > b > a$

18. In the figure, $ACDE$ is a rectangular horizontal plane, $ABFE$ is a rectangular inclined plane where its inclination is 30° . E is due south of D . BE makes an angle of 56° with the line of greatest slope EF . Find the compass bearing of B from E correct to 3 significant figures.

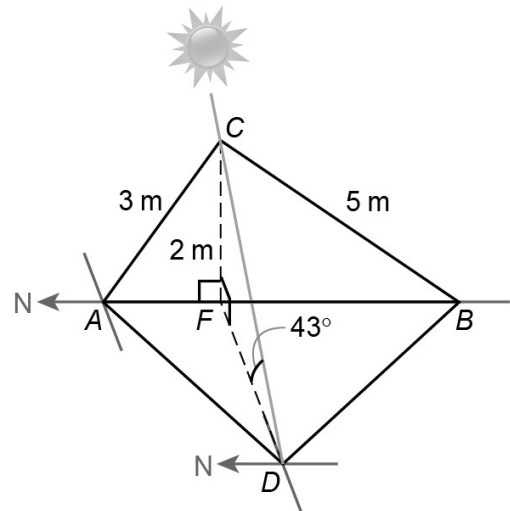


- A. $N30.3^\circ W$
 B. $N37.9^\circ W$
 C. $N52.1^\circ W$
 D. $N59.7^\circ W$
19. In the figure, $ACDE$ is a rectangular horizontal plane, $ABFE$ is a rectangular inclined plane where its inclination is 38° . If M is a point on BF such that $BM:MF=2:1$ and $\angle BAM=50^\circ$, find the inclination of AM correct to 3 significant figures.



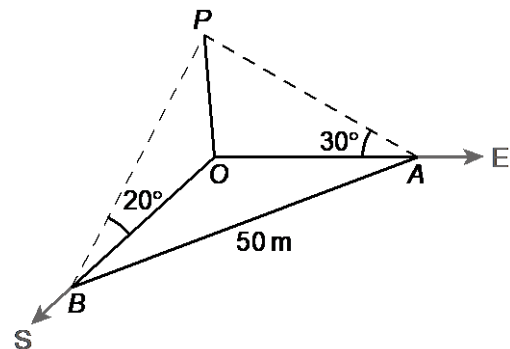
- A. 23.3°
 B. 31.7°
 C. 66.7°
 D. 73.3°
20. In the figure, ABC is a wall standing vertically on the horizontal ground, where A is due north of B , $AC=3$ m and $BC=5$ m. F is the foot of perpendicular from C to AB , where $CF=2$ m. When the sun shines from the east with an angle of elevation of 43° , the shadow of the wall on the horizontal ground is $\triangle ABD$. Find the

area of shadow ABD correct to 3 significant figures.



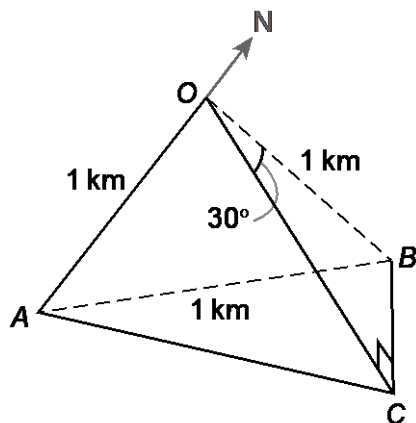
- A. 7.31 m^2
 B. 7.50 m^2
 C. 8.04 m^2
 D. 8.41 m^2

21. In the figure, O , A and B are three points on the same horizontal plane, where A is due east of O and B is due south of O . PO is a flag pole which stands vertically on the horizontal plane. If $AB=50$ m and the angles of elevation of P from A and B are 30° and 20° respectively, find the height of the flag pole PO correct to 1 decimal place.








- A. 15.4 m
 B. 19.9 m
 C. 29.2 m
 D. 93.7 m

22. In the figure, O , A and C are three points on a horizontal plane, where A is due south of O . B is a point vertically above C . The angle of elevation of B from O is 30° . If $OA = OB = AB = 1$ km, find the compass bearing of B from O correct to 1 decimal place.




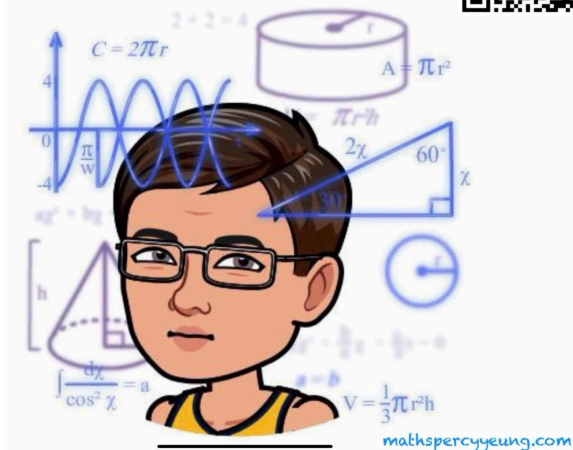
- A. N54.7°E
- B. S54.7°E
- C. N35.3°E
- D. S35.3°E

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