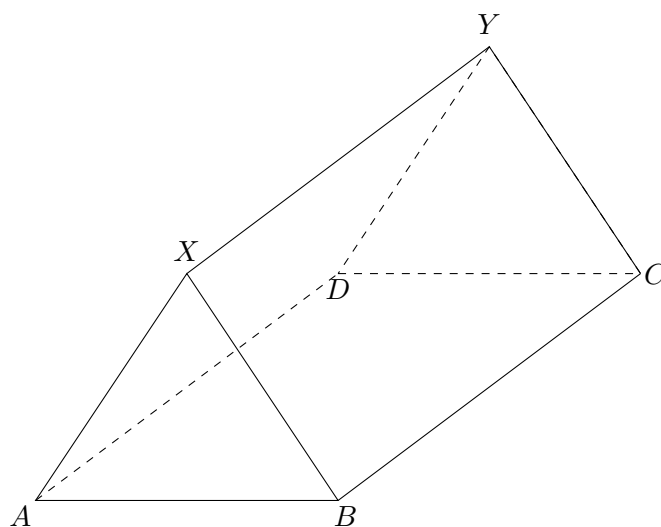
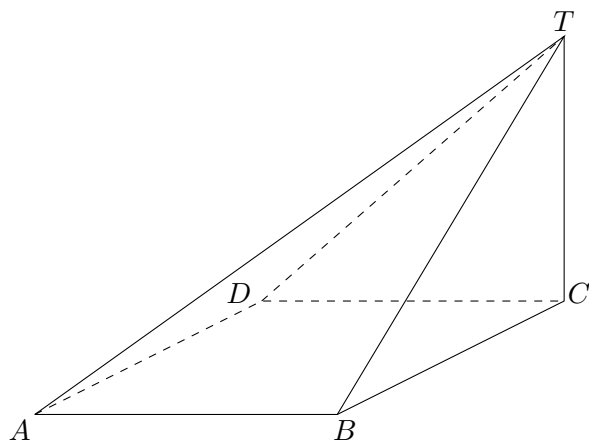
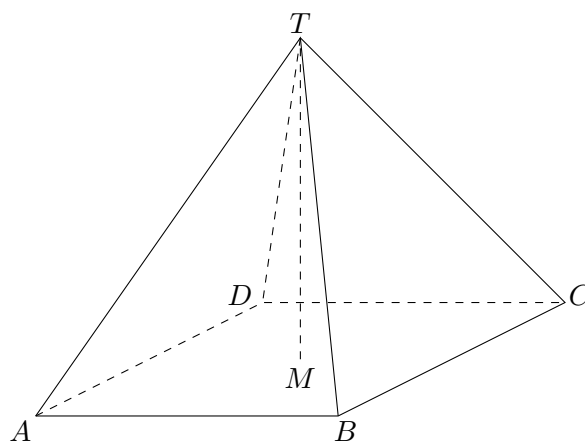
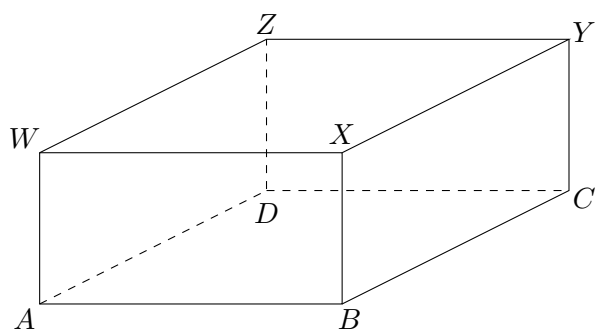


3D Trigonometry

Patrons are given questions on four types of shapes:

1. A CUBOID.
2. A PYRAMID. (A rectangular base such that the vertex lies above the mid-point of the rectangle.)
3. A YANGMA. (A rectangular based pyramid such that the vertex lies above one of the rectangle's corners.)
4. A PRISM. (A prism with triangular cross-section.)



Please give all non-exact answers to three significant figures.

Questions

1. CUBOID. $AB = 7$ $BC = 6$ $CY = 4$.

- (a) Find the length AY .
- (b) Find the angle the diagonal AY makes with the plane $ABCD$.
- (c) Find the angle the diagonal AY makes with the plane $ADZW$.

$$\sqrt{101}$$

$$23.5^\circ$$

$$44.1^\circ$$

2. PYRAMID. $AB = 8$ $BC = 6$ $CT = 9$.

- (a) Find the length AC .

$$10$$

- (b) Find the length MT . $\sqrt{56}$
- (c) Find the angle CT makes with the plane $ABCD$. 56.3°
- (d) Find the angle \hat{ATC} . 67.5°
- (e) Find the angle between the planes $ABCD$ and ADT . 61.9°

3. YANGMA. $AB = 11$ $BC = 11$ $CT = 5$.
- (a) Find the length BT . $\sqrt{146}$
- (b) Find the length AT . $\sqrt{267}$
- (c) Find the angle AT makes with the plane $ABCD$. 17.8°
- (d) Find the angle between the planes ABT and $ABCD$. 24.4°
4. PRISM. $AB = BX = XA = 8$ $BC = 12$.
- (a) Find the length XC . $\sqrt{208}$
- (b) Find the angle $C\hat{X}A$. 73.9°
- (c) Find the angle that XC makes with the plane $ABCD$. 25.7°
5. CUBOID. $AB = 9$ $BC = 12$ $AYC = 65^\circ$.
- (a) Find the length CY . 6.99
- (b) Find the length AY . 16.6
- (c) Find the angle the diagonal WC makes with the plane $BCYX$. 32.9°
6. PYRAMID. $AB = 10$ $CAB = 50^\circ$ $TAM = 40^\circ$.
- (a) Find the length BC . 11.9
- (b) Find the length MT . 6.53
- (c) Find the length DT . 10.2
- (d) Find the angle between the planes $ABCD$ and ADT . 52.5°
7. YANGMA. $AB = 12$ $BC = 15$ $TAC = 28^\circ$.
- (a) Find the length TC . 10.2
- (b) Find the length AT . 17.0
- (c) Find the angle BT makes with the plane $ABCD$. 34.3°
- (d) Find the angle between the planes ADT and $ABCD$. 40.4°
8. PRISM. $AB = 6$ $BX = 7$ $ABX = 50^\circ$ $BCX = 22^\circ$.
- (a) Find the length BC . 17.3
- (b) Find the length XC . 18.7
- (c) Find the angle $A\hat{Y}B$. 18.7°
- (d) Find the angle AY makes with the plane $ABCD$. 17.1°