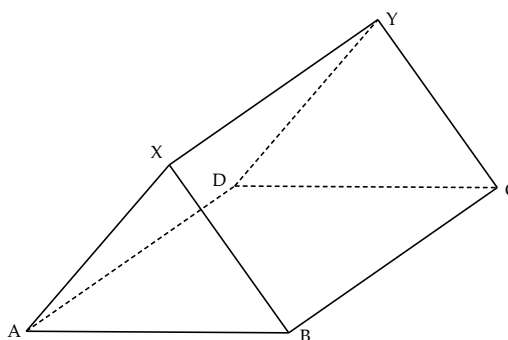
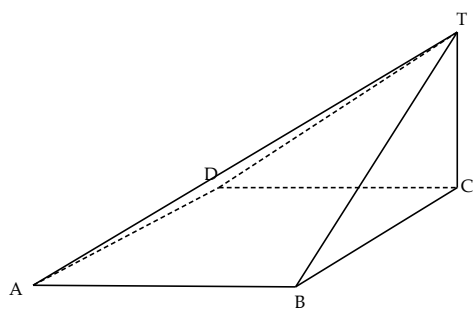
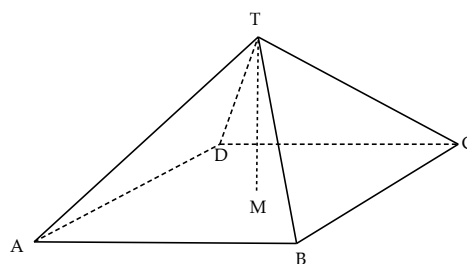
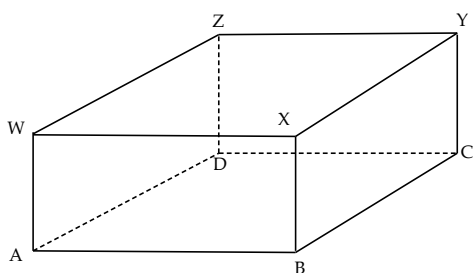


## E Summer 3D Trigonometry

Patrons are given questions on four types of shapes:

1. A CUBOID. (A rectangular prism with a rectangular base and vertical edges.)
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  $ADZW$ .

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

- (a) Find the length  $AC$ .
- (b) Find the length  $MT$ .
- (c) Find the angle  $CT$  makes with the plane  $ABCD$ .
- (d) Find the angle  $\hat{A}TC$ .
- (e) Find the angle between the planes  $ABCD$  and  $ADT$ .

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  $ABCD$ .  $17.8^\circ$
- (d) Find the angle between the planes  $ABT$  and  $ABCD$ .  $24.4^\circ$
4. PRISM.  $AB = BX = XA = 8$   $BC = 12$ .
- (a) Find the length  $XC$ .  $\sqrt{208}$
- (b) Find the angle  $C\hat{X}A$ .  $73.9^\circ$
- (c) Find the angle that  $XC$  makes with the plane  $ABCD$ .  $25.7^\circ$
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  $BCYX$ .  $32.9^\circ$
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  $ADT$ .  $52.5^\circ$
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  $ABCD$ .  $34.3^\circ$
- (d) Find the angle between the planes  $ADT$  and  $ABCD$ .  $40.4^\circ$
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  $A\hat{Y}B$ .  $18.7^\circ$
- (d) Find the angle  $AY$  makes with the plane  $ABCD$ .  $17.1^\circ$