Worksheet: Parallel and Perpendicular Planes

Q1: X and Y are two parallel planes, where A is a point between the two planes. Two straight lines are drawn from the point A such that one intersects the planes X and Y at points B and C respectively, and the other intersects the planes X and Y at points D and H respectively. If $\frac{AB}{AC} = \frac{1}{3}$ and the surface area of $\triangle AHC = 450$ cm^2, find the surface area of $\triangle ABD$.

A 1,350 cm^2

B 50 cm^2

C 150 cm^2

D 300 cm^2

Q2: X and Y are two parallel planes, and $\overrightarrow{MA}$, $\overrightarrow{MB}$, and $\overrightarrow{MC}$ are drawn to intersect the plane X at the points A, B, and C, respectively, and the plane Y at the points D, E, and F, respectively, where the point M doesn't belong to any of the planes. Given that $MA : MD = 2 : 7$, $AB = 18$ cm, $EF = 68$ cm, and $m\angle ABC = 90°$, determine the area of the $\triangle DEF$.

A 2,142 cm^2

B 2,448 cm^2

C 1,836 cm^2

D 786.9 cm^2

Q3: Given that the plane $Kz + 2x + 3y = -4$ is parallel to the plane $Ly - 2x - 2z = 3$, find the values of K and L.

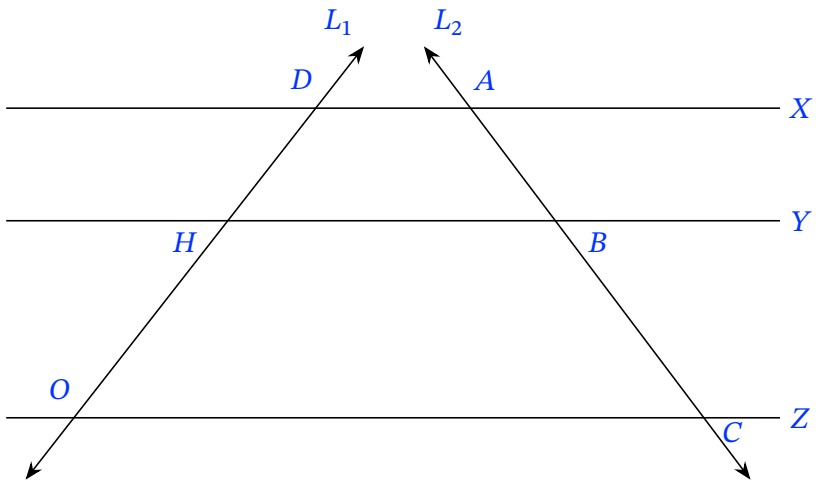
A $K = -2, L = 3$

B $K = -3, L = 2$

C $K = 2, L = -2$

D $K = 2, L = -3$

Q4: X,Y, and Z are three parallel planes intersected by two coplanar straight lines L_1 and L_2, where $\frac{DH}{HO} = \frac{4}{7}$. If $AC = 44$ cm, find the length of $\overline{AB}$.



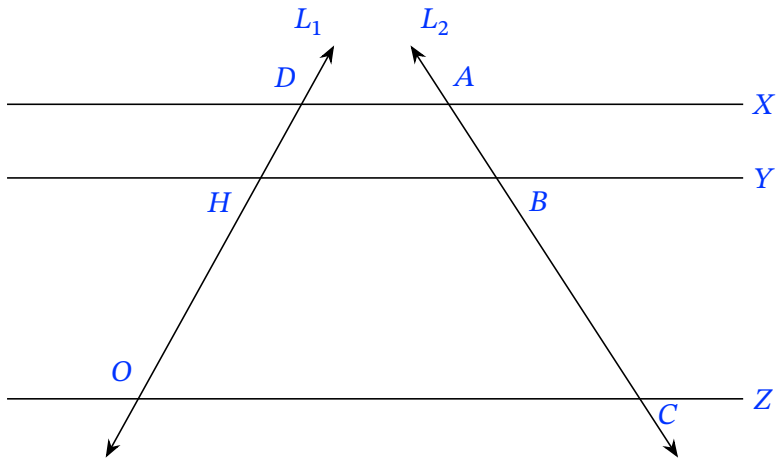
A 16 cm

B 28 cm

C 25 cm

D 77 cm

Q5: X,Y, and Z are three parallel planes intersected by two coplanar straight lines L_1 and L_2 such that $\frac{DH}{HO} = \frac{1}{3}$. If $AC = 48$ cm, find the length of $\overline{BC}$.



A 36 cm

B 16 cm

C 12 cm

D 144 cm

Q6: Given that the plane $3x - 3y - 3z = 1$ is perpendicular to the plane $ax - 2y - z = 4$, find the value of a.

A -1

B 3

C -3

D -2

Q7: Two 3D shapes lie between two parallel planes. Any other plane which is parallel to the two planes intersects both shapes in regions of the same area. What can you deduce about the shapes?

A They are congruent.

B They are similar.

C They are both prisms.

D They have the same surface area.

E They have the same volume.

Q8: The point (x, y, z) is moving parallel to the z-axis. Which of the variables x, y, and z remain constant?

A x, y

B x only

C z only

D y, z

E x, z

Q9: The point (x, y, z) is moving parallel to the y-axis. Which of the variables x, y, and z remain constant?

A y, z

B z only

C y only

D x, z

E x, y

Q10: The point (x, y, z) is moving parallel to the x-axis. Which of the variables x, y, and z remain constant?

A y only

B x, z

C y, z

D x only

E x, y