TRIGONOMETRY & COMPOUND SHAPES

Mastery Worksheet

I DO

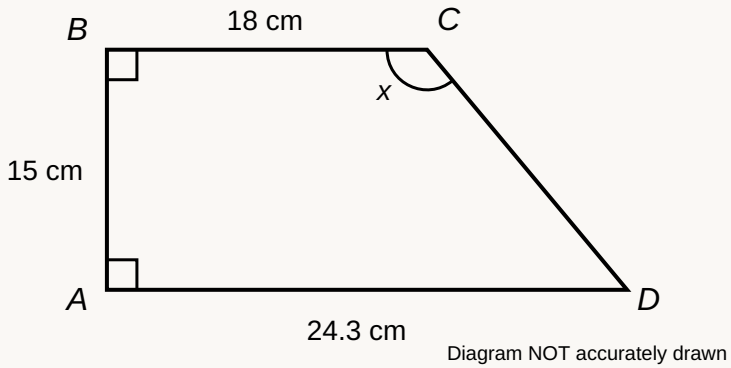

Diagram NOT accurately drawn

ABCD is a trapezium.

Work out the size of angle *x*.

Give your answer correct to 1 decimal place.

WE DO

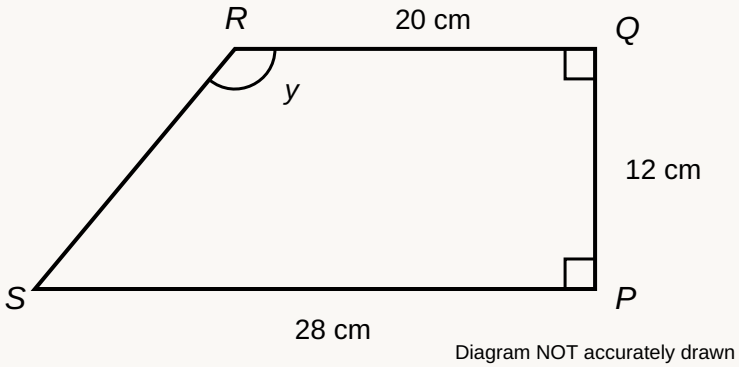

Diagram NOT accurately drawn

PQRS is a trapezium.

Work out the size of angle *y*.

Give your answer correct to 1 decimal place.

YOU DO 1

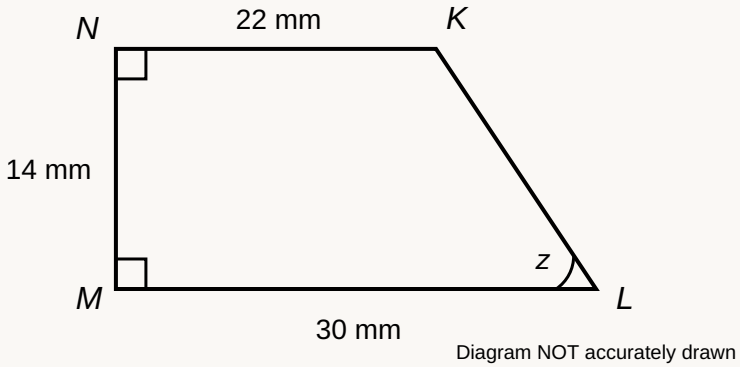

Diagram NOT accurately drawn

KLMN is a trapezium.

Work out the size of angle *z*.

Give your answer correct to 1 decimal place.

YOU DO 2

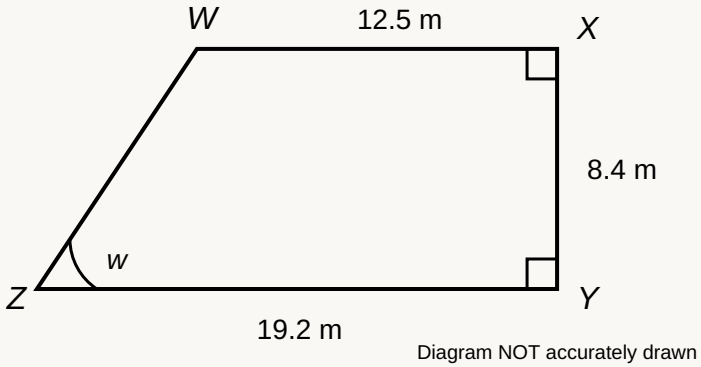

Diagram NOT accurately drawn

WXYZ is a trapezium.

Work out the size of angle *w*.

Give your answer correct to 1 decimal place.

CHALLENGE 1 (ANGLE OF ELEVATION)

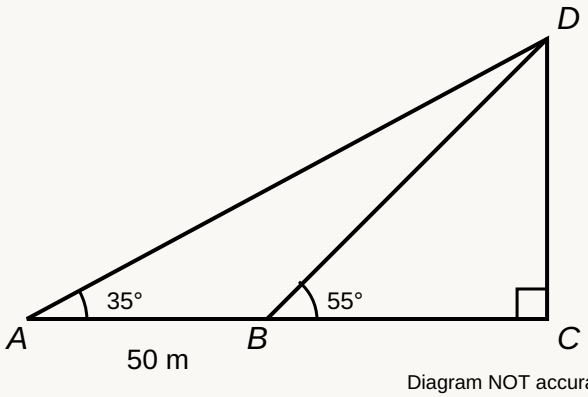

Diagram NOT accurately drawn

A man looks up at the top of a tower, *D*, from point *A*. The angle of elevation is 35°.
He walks 50 m closer to the tower to point *B*. The new angle of elevation is 55°.
Calculate the height of the tower, *CD*.
Give your answer correct to 1 decimal place.

CHALLENGE 2 (3D TRIGONOMETRY)

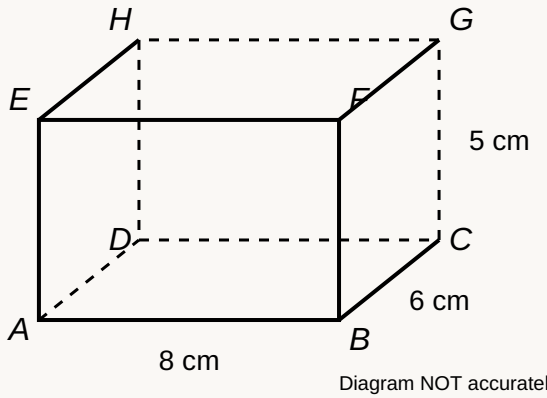

Diagram NOT accurately drawn

ABCDEFGH is a cuboid.

AB = 8 cm, *BC* = 6 cm and *CG* = 5 cm.

Calculate the size of the angle between the space diagonal *AG* and the base *ABCD*.

Give your answer correct to 1 decimal place.

ANSWERS & WORKED SOLUTIONS

I Do

Step 1: Draw a perpendicular line from C to AD. Let the intersection be E.

Step 2: Triangle CED is a right-angled triangle. CE = 15 cm.

Step 3: ED = 24.3 - 18 = 6.3 cm.

Step 4: Angle ECD = $\tan^{1}(6.3 / 15) = 22.78°$.

Step 5: Angle $x = 90 + 22.78 = 112.78°$.

Answer: 112.8°

We Do

Step 1: Draw a perpendicular line from R to SP. Let the intersection be F.

Step 2: Triangle RFS is a right-angled triangle. RF = 12 cm.

Step 3: SF = 28 - 20 = 8 cm.

Step 4: Angle FRS = $\tan^{1}(8 / 12) = 33.69°$.

Step 5: Angle $y = 90 + 33.69 = 123.69°$.

Answer: 123.7°

You Do 1

Step 1: Draw a perpendicular line from K to ML. Let the intersection be F.

Step 2: Triangle KFL is a right-angled triangle. KF = 14 mm.

Step 3: FL = 30 - 22 = 8 mm.

Step 4: Angle $z = \tan^{1}(14 / 8) = 60.25°$.

Answer: 60.3°

You Do 2

Step 1: Draw a perpendicular line from W to ZY. Let the intersection be F.

Step 2: Triangle WZF is a right-angled triangle. WF = 8.4 m.

Step 3: ZF = 19.2 - 12.5 = 6.7 m.

Step 4: Angle $w = \tan^{1}(8.4 / 6.7) = 51.42°$.

Answer: 51.4°

Challenge 1

Step 1: Let height CD = h and BC = x.

Step 2: In ΔBCD, $h = x \tan(55)$. In ΔACD, $h = (x + 50) \tan(35)$.

Step 3: $x \tan(55) = x \tan(35) + 50 \tan(35)$.

Step 4: $x(1.428 - 0.700) = 35.01 \Rightarrow x = 35.01 / 0.728 = 48.1$ m.

Step 5: $h = 48.1 \times \tan(55) = 68.69$ m.

Answer: 68.7 m

Challenge 2

Step 1: Find the length of the base diagonal AC using Pythagoras' theorem.

Step 2: $AC = \sqrt{(8^2 + 6^2)} = \sqrt{(64 + 36)} = \sqrt{100} = 10$ cm.

Step 3: The angle required is angle CAG in the right-angled triangle ACG.

Step 4: $\tan(\theta) = CG / AC = 5 / 10 = 0.5$

Step 5: $\theta = \tan^{1}(0.5) = 26.565°$.

Answer: 26.6°