

EQUITY

LEARNING PLACE

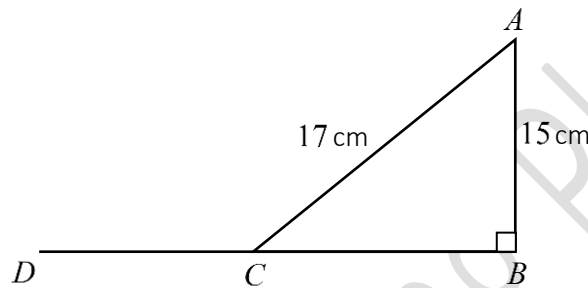
Elementary Math Topical (Trigonometry)

Question 1:

The area of triangle XYZ is 124.9cm^2 . $XY = 14.6\text{ cm}$ and $XZ = 19.2\text{ cm}$. Find the two possible sizes of angle YXZ .

Question 2:

In the diagram, $\angle ABC = 90^\circ$, $AB = 15\text{ cm}$, $AC = 17\text{ cm}$ and BCD is a straight line.



a) Find the length of BC .

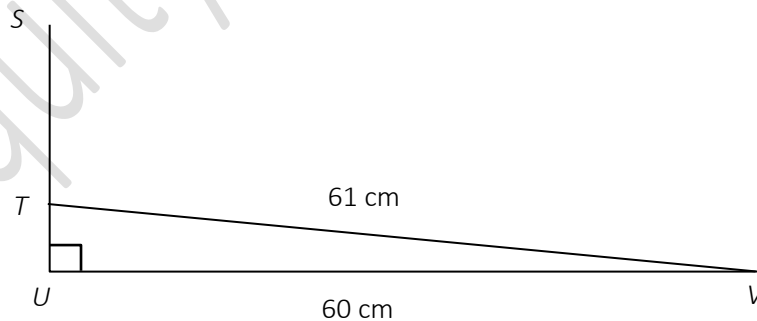
Express as a fraction in its simplest form, the value of

b) $\tan \angle BAC$

c) $\cos \angle ACD$

Question 3:

In the diagram below, angle $TUV = 90^\circ$, $UV = 60\text{ cm}$, $TV = 61\text{ cm}$ and STU is a straight line.



Find, as a fraction in its lowest term,

a) $\sin \hat{T}VU$

b) $\cos \hat{S}T\hat{V}$

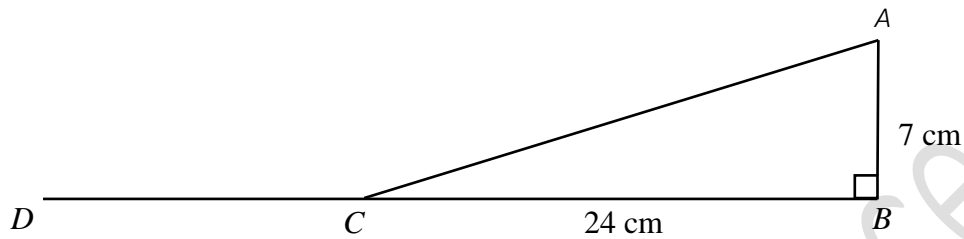
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Question 4:

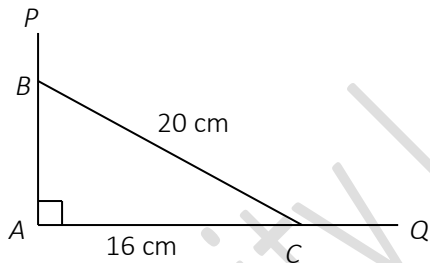
In the diagram, BCD is a straight line. $AB = 7$ cm, $BC = 24$ cm and angle $ABC = 90^\circ$.



- a) $\sin \angle ACB$,
- b) $\cos \angle ACD$

Question 5:

ABC is a triangle in which $\angle BAC$ is 90° , $AC = 16$ cm and $BC = 20$ cm. AB is produced to P and AC is produced to Q .



- a) Calculate $\angle ABC$
Express as a fraction
- b) $\sin \angle BCA$
- c) $\cos \angle BCQ$.

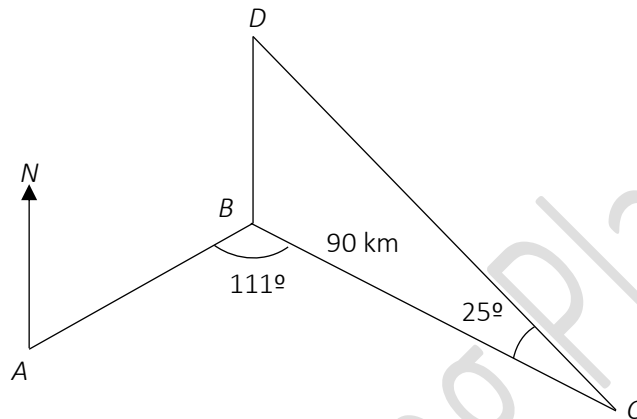
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Question 6:

A ship sails from a Port A at 10 00 on a bearing of 050° towards port B . It sails at an average speed of 30 km/h, reaching Port B at 12 35. From port B , it sails to Port C which is 90 km away. The ship sets sail again to Port D , which is due north of Port B . The figure below shows the route taken by the ship.

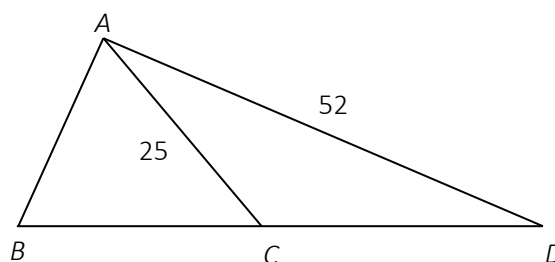


Given also that $\angle ABC = 111^\circ$ and $\angle BCD = 25^\circ$.

- Show that the distance of $AB = 77.5$ km.
- Calculate the distance of AC .
- Calculate the distance of BD
- Find the bearing of A from C , to the nearest degree.
- The ship sent a distress signal that a crew member had fallen overboard. A search and rescue team decided to comb the area enclosed by port B , C and D . Find this area.
- A helicopter, H is hovering at a point 3 km vertically above port B . Calculate the angle of elevation of the helicopter when viewed from Port C .

Question 7:

In the figure below, BCD is a straight line. $AD = 52$ cm, $AC = 25$ cm and $\sin \angle ADC = \frac{5}{13}$. Calculate the value of $\sin \angle ACB$, giving your answer as a fraction in its lowest terms.



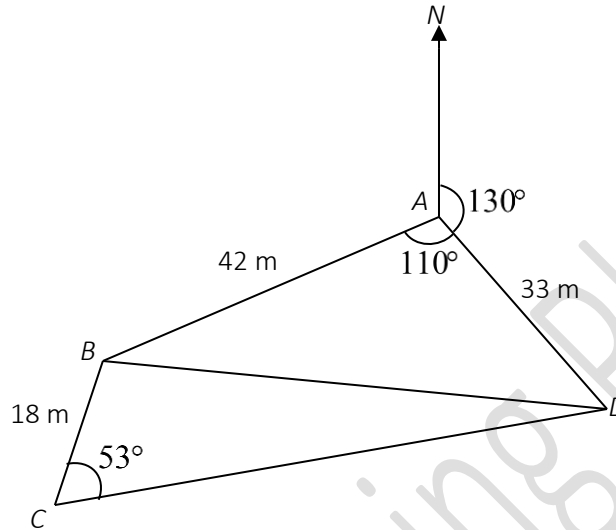
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Elementary Math Topical (Trigonometry)

Question 8:

A, B, C and D are points on horizontal ground. D is 33 m from A on a bearing of 130° .
 $\angle BAD = 110^\circ$, $\angle BCD = 53^\circ$, $BC = 18$ m and $AB = 42$ m.



Calculate

- the length of BD ,
- $\angle BDC$
- the area of triangle ABD ,
- the shortest distance from A to BD
- the bearing of A from B
- A tower of height 65 m is erected vertically at point A . Find the greatest angle of elevation when viewed from along the path BD .

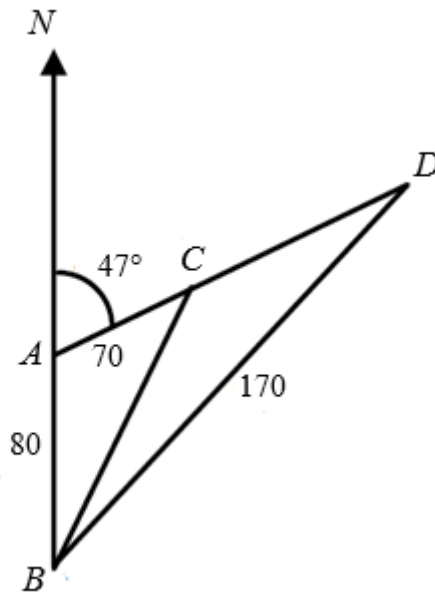
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Question 9:

The diagram shows four points, A , B , C and D on the ground. The bearing of D from A is 047° . B is 80 m due south of A and C is on the line AD , such that C is 70 m away from A and BD is 170 m apart.



Find

- the distance BC ,
- $\angle ADB$,
- the bearing of D from B .
- There is a tree planted at A . A boy measures the angle of elevation of the top of the tree from B and finds that it is 23° . Find the height of the tree, assuming that the boy's height is negligible.
- The boy decides to walk from B to D along the line BD , until he reaches a point X such that AX is the shortest. Find the distance AX .

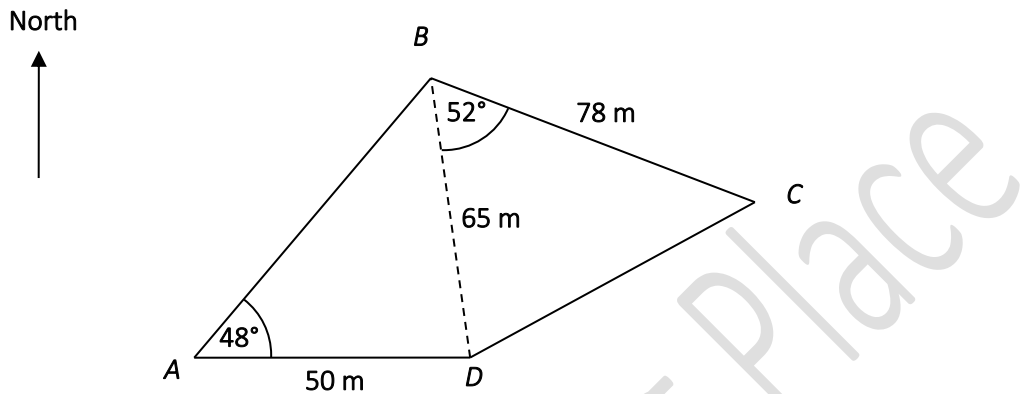
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Question 10:

The diagram shows a field $ABCD$ on horizontal ground, with a path BD cutting through the field. D is due east of A . Angle $BAD = 48^\circ$ and angle $CBD = 52^\circ$. $AD = 50$ m. $BD = 65$ m. $BC = 78$ m.



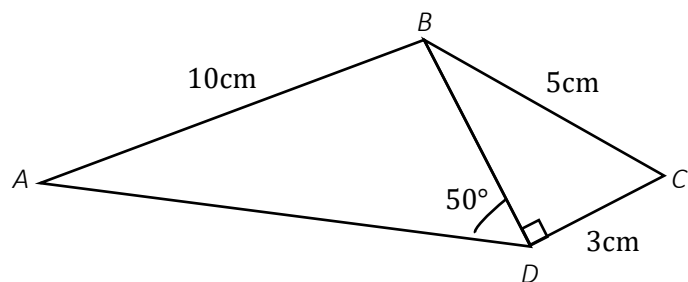
Calculate

- the bearing of A from B ,
- angle ABD
- area of triangle CBD
- CD
- There is a tower of height 20 m at C . A boy walks from B to D and at a point between B and D , he stopped and the angle of elevation to the top of the tower is the largest. Find the angle of elevation to the top of the tower.

Question 11:

In the diagram, angle $BDA = 50^\circ$, angle $BDC = 90^\circ$, $AB = 10$ cm, $BC = 5$ cm and $CD = 3$ cm.

- Find BD
- Find angle BAD



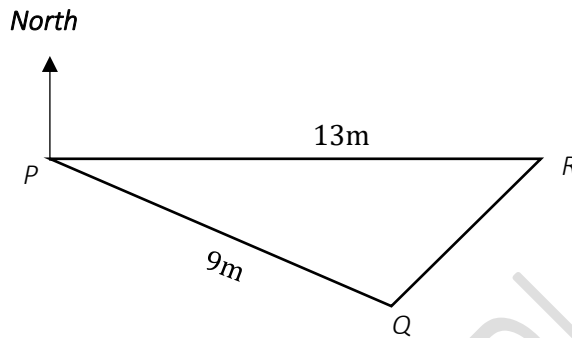
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Question 12:

P , Q and R are 3 locations of a park such that R is due east of P . The dimensions of the park are given as $PQ = 9\text{m}$, $PR = 13\text{m}$ and $QR = 7\text{m}$.



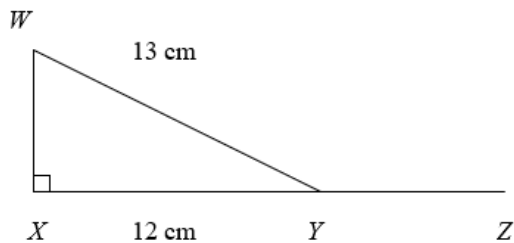
- Calculate angle QPR .
- Show that obtuse angle $PQR = 108.0^\circ$, correct to nearest 1 decimal place.
- Find the bearing of R from Q .
- Find the bearing of P from Q .

There is a tree of height 2.02m at Q . Calculate

- the shortest distance from Q to PR
- the greatest angle of elevation of the top of the tree from a point along the line PR .

Question 13:

In triangle WXY , angle $WXY = 90^\circ$ and XY is produced to Z .



Write down the value of

- $\tan \angle WYX$
- $\cos \angle WYZ$
- Calculate the perpendicular distance from X to WY .

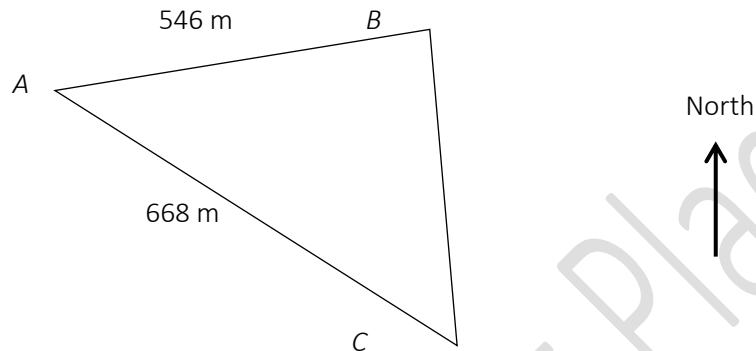
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Elementary Math Topical (Trigonometry)

Question 14:

Town A , B and C are situated on an island. The bearing of B from A is 073° and the bearing of C from A is 104° . The distance between A and B is 546 m and the distance between A and C is 668 m.



Calculate

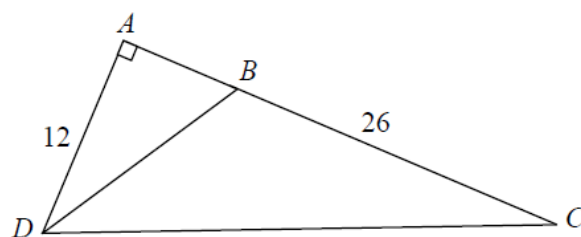
- angle BAC
- the distance BC
- angle ACB

Town B has a lighthouse. The angle of elevation to the top of the lighthouse from A is 10° . Calculate

- the height of the lighthouse
- the greatest possible angle of depression from the top of the lighthouse to a point between Town A and Town C .

Question 15:

In the diagram, ABC is a straight line and $\angle DAB = 90^\circ$. $AD = 12$ cm, $BC = 26$ cm and $\sin \angle ABD = \frac{4}{5}$. Find, as a fraction, the value of $\cos \angle DBC + \tan \angle ADC$.



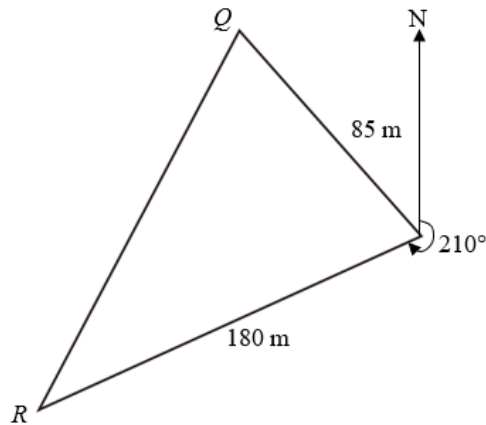
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Elementary Math Topical (Trigonometry)

Question 16:

In the diagram, PQR represents a horizontal field such that $PQ = 85$ m and R is 180 away. In the diagram, PQR represents a horizontal field such that $PQ = 85$ m and R is 180 away.



a) Find the bearing of P from R .

Given that $\angle PQR$ is 70° , calculate

b) $\angle QRP$

c) area of the field

d) the shortest distance from Q to PR .

e) A drone is flying above point Q at a height of 450 m. Find the greatest possible angle of depression from the drone to a point along the path PR .

Question 17:

The sine of an angle is 0.4321 .

Give two possible values for the angle.

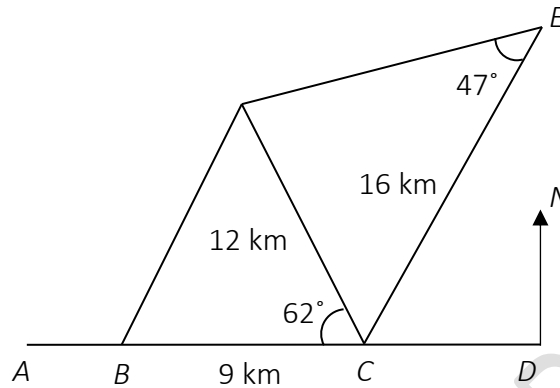
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Question 18:

Points A, B, C, D, E and F are on horizontal ground. A, B and C are due west of D . E is due north of D .



Given that $BC = 9$ km, $CF = 12$ km, $CE = 16$ km, $\angle BCF = 62^\circ$ and $\angle CEF = 47^\circ$,

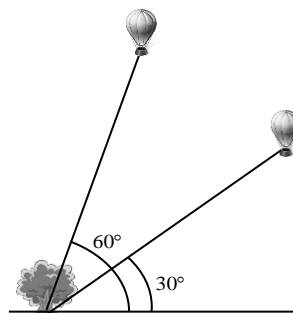
- calculate the length of BF ,
- calculate the acute angle CFE ,
- find the area of the quadrilateral $BCEF$,
- find the bearing of E from C .

A vertical flag is 3490 m vertically above F .

- Find the angle of elevation of the top of the flag from C .

Question 19:

A hot air balloon was tied with a 400 m rope to the bottom of a tree. At first, the angle between the rope and ground was 60° and finally decreased to 30° . Find the vertical distance that the hot air balloon descended.



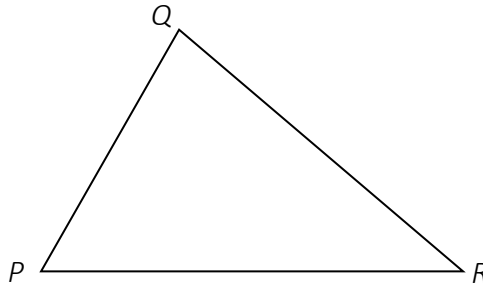
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Question 20:

In the diagram, the ratio of $PQ : QR : PR = 5 : 6 : 7$.



Calculate

- the value of $\cos \angle PQR$, expressing your answer as a fraction.
- the ratio of $\sin \angle PQR : \sin \angle QPR$, expressing your answer as a ratio of two integers.