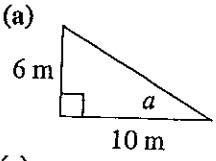
Trigonometry.

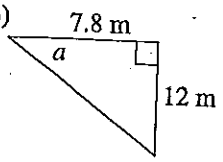
A. Trigonometry: Using tan to find angles

1 Find the missing angle expressed in decimal form:

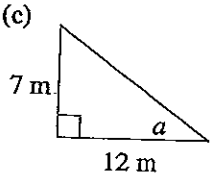
(a)



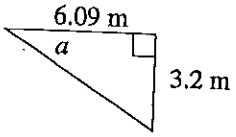
(b)



(c)

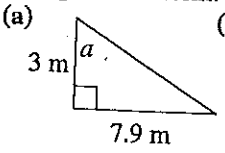


(d)

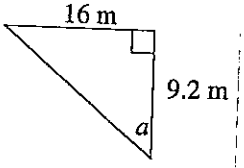


2 Find the missing angle expressed in degree/min form:

(a)



(b)



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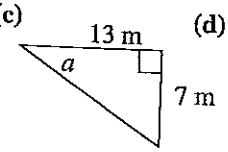

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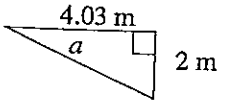
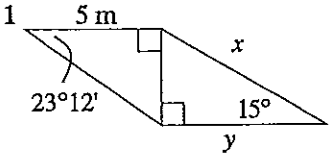


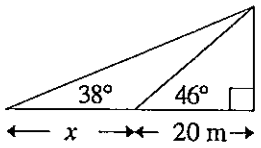
B. Trigonometry: Composite figures

Find the missing lengths in the following:

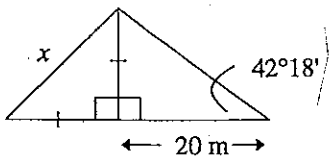
1



2



3



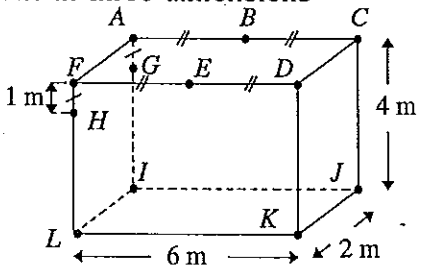
C. Trigonometry: Practical applications in two dimensions

1 A yacht travels for 10 km on the bearing E15°N and then a further 15 km on the bearing E45°N. Find:
(a) How far east it has travelled? (b) How far north it has travelled?
(c) The straight line distance between where it finished and where it started.

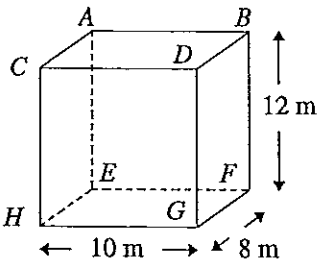
2 A hiker standing 400 m from the base of a cliff sights the top of it and measures the angle of elevation at 12°15'. Find the height of the cliff.

D. Trigonometry: Practical applications in three dimensions

1 Find the angle between the planes:
(a) *ACDF* and *GCDH*
(b) *AGHF* and *GCDH*
(c) *IJKL* and *LIEB*
(d) *AFHG* and *GBEH*



2 Find the angle that the body diagonal of this cuboid makes with the faces:
(a) *EFGH*
(b) *ABFE*
(c) *BDGF*

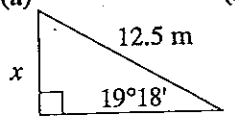


Trigonometry

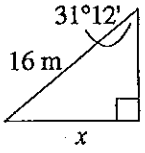
E. Trigonometry: Using sin to find side lengths

1 Find the sides:

(a)



(b)



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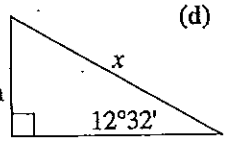
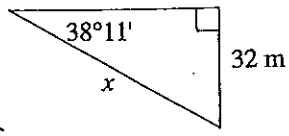


(d)



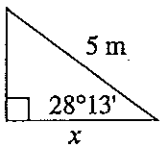
2 A yacht sails 7 km on a bearing S23°W. How far west is it from its starting point?

3 A person sights a ship at sea from the top of a cliff with an angle of depressions of 32°14'. If the distance between the person and the ship (hypotenuse of the triangle) is 890 m, find how far the ship is from the base of the cliff.

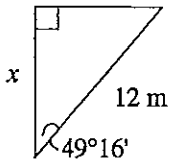
F. Trigonometry: Using cos to find side lengths

1 Find the missing sides:

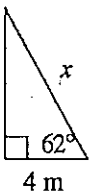
(a)



(b)



(c)



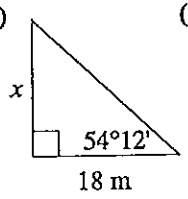
2 A yacht sails 6 km on the bearing W14°N. How far west has it travelled from where it started?

3 A hiker sights the top of a cliff from a flat plain. If the angle of elevation is 63° measured from 500 m from the base of the cliff what is the straight line distance between the hiker and the top of the cliff?

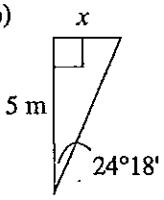
G. Trigonometry: Using tan to find side lengths

1 Find the missing sides:

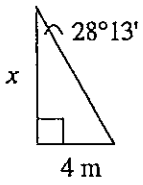
(a)



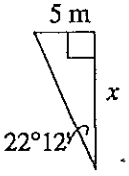
(b)



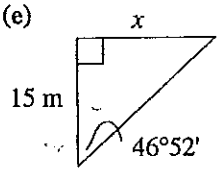
(c)



(d)



(e)



2 A hiker sights the top of a water tower. If the angle of elevation is 23°18', 300 m from the base of the tower find the height of the tower.

Trigonometry Answers

A. 1 (a) 30.96° (b) 56.98°
(c) 30.26° (d) 27.72°
2 (a) 69°12' (b) 60°6'
(c) 28°18' (d) 26°24'

B. 1 (a) $x = 8.28$ m (b) $y = 8.00$ m
2 $x = 6.5$ m 3 $x = 25.74$ m

C. 1 (a) 20.27 km (b) 13.19 km (c) 25 km
2 86.85 m

D. 1 (a) 9.46° (b) 80.54° (c) 53.13°
(d) 71.57°
2 (a) 43.14° (b) 27.12° (c) 34.74°

E. 1 (a) 4.13 m (b) 8.29 m (c) 23.04 m
(d) 51.76 m
2 2.74 km
(a) 752.84 m

F. 1 4.41 m 2 7.83 m 3 8.52 m 4 122.5 m
2 5.82 km 3 1101 m

G. 1 (a) 24.96 m (b) 2.26 m (c) 7.45 m
2 (a) 129.2 m (b) 12.25 m (c) 16.01 m