Society of Actuaries in Ireland

Maths Tutorials – Trigonometry 1 - Questions

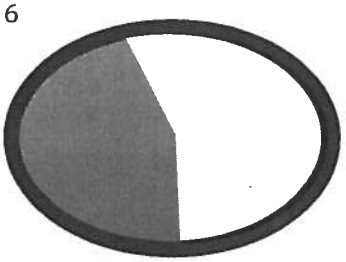
Q1

a) Express $\frac{2\pi}{5}$ radians in degrees.

b) Express 210° in radians.

Q2

The diagram shows a circle c with centre O and radius 12cm. Also shown is the minor sector ABO. The minor arc [AB] subtends an angle of $\frac{5\pi}{6}$ rads at the centre.



(i) Label the diagram.

(ii) Find the length of the minor arc [AB]

(ii) Find the area of the major sector ABO

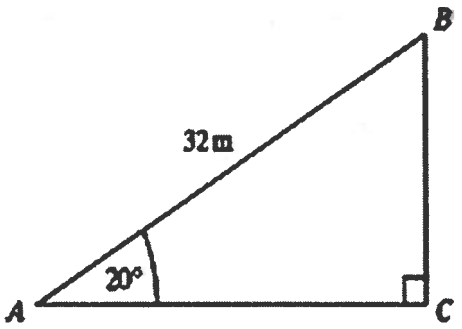
Q3

The diagram shows a triangle ABC.

Angle A = 20° and angle C = 90° AB = 32m

Calculate the height |BC|.

Solve the triangle.



Q4

If $\tan B = \frac{\sqrt{5}}{2}$, find the value of $\sin B$ and $\cos B$.

Q5

1) Find $\cos 72°18'$, correct to 4 decimal places.
2) If $\sin A = 0.5216$, find A correct to the nearest second.
3) If $\sin A = \frac{4}{7}$, find A
4) Given $D = \frac{3}{4}\pi \; Rads$ find cosec D

Q6

Make sketches of the following triangles:

- An Isosceles right-angled triangle with sides = 1 unit.
- An Equilateral triangle with sides = 2 units. Draw a line to divide this triangle into two equal right-angled triangles.

Solve all three triangles and hence calculate Sin, Cos and Tan of 30°, 45° and 60° in surd form.

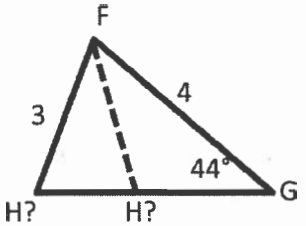
Q7

1) Express in surd form, $cos(-135°)$.
2) If $\sin x = -\frac{\sqrt{3}}{2}$, find two values for x if $0° \leq x \leq 360°$.

Q8

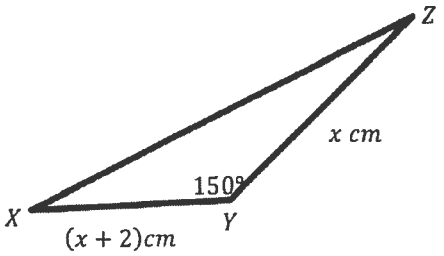
In a triangle FGH, $|FG|$ = 4cm, $|FH|$ = 3cm and $|\angle FGH| = 44°$.

Find the possible values of $\angle FHG$.



Q9

Given that the area of this triangle is 6 cm^2 find the value of x



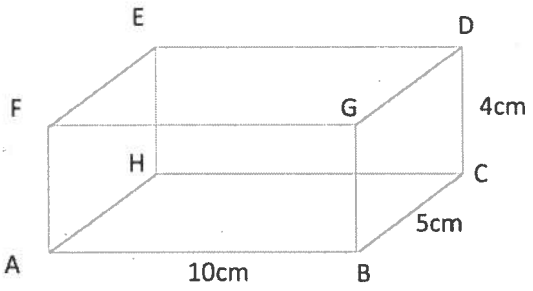
Q10

A builder ropes off a triangular plot of ground, PQR. The length of $|PQ| = 42\,m$ and the length of $|PR| = 50\,m$. $|\angle QPR| = 72°$. Calculate the length of rope needed by the builder. Give your answer correct to one decimal place.

Q11

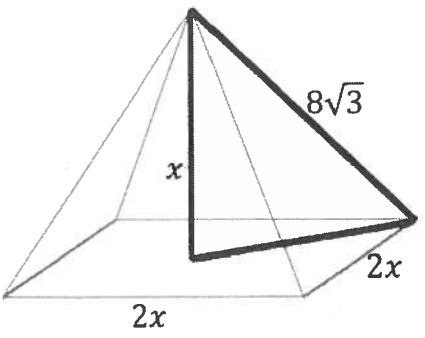
An open rectangular box has dimensions 10cm by 5cm by 4cm, as shown.

1) Find the length of the diagonal [GH].
2) Find the measure of the angle between GH and the base of the box.



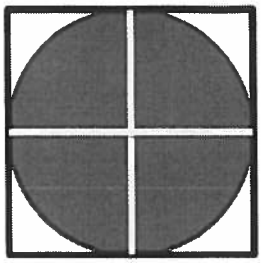
Q12

The diagram represents a right pyramid. The base is a square of side $2x\ cm$. The length of each of the slant edges is $8\sqrt{3}cm$. The height of the pyramid is $x\ cm$. Calculate the value of x.



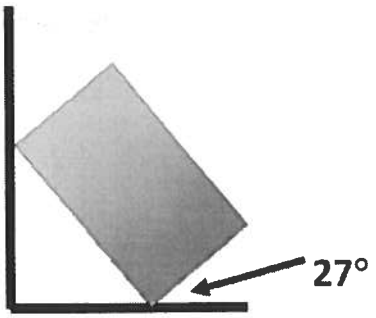
Q13

A square is inscribed in a circle, as shown. If the area of the circle is π square units, find the area of the square.



Q14

A rectangular paving stone 3m by 1m rests against a vertical wall as shown. What is the height of the highest point of the stone above the ground? Give your answer in meters, correct to two decimal places.



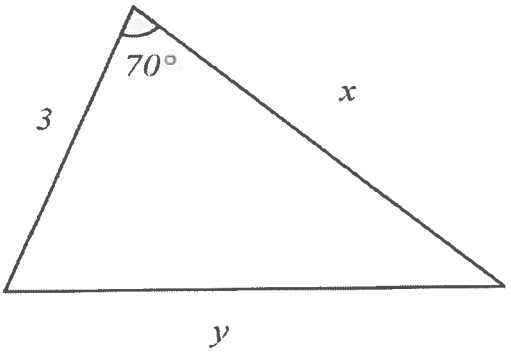
Q15

Find all the solutions to the equation $\cos 3x = \frac{\sqrt{3}}{2}$, for $0° \leq x \leq 360°$.

Q16

The area of the triangle shown is 15 square units.

- Find the value of x, correct to two decimal places.
- Using the Cosine Rule, find the value of y.



Q17

The diagram shows a semi-circle standing on a diameter $[AC]$, and $[BD] \perp [AC]$.

If $|AB| = x$ and $|BC| = 1$ and $|BD| = y$, write y in terms of x.