11.2 Answers

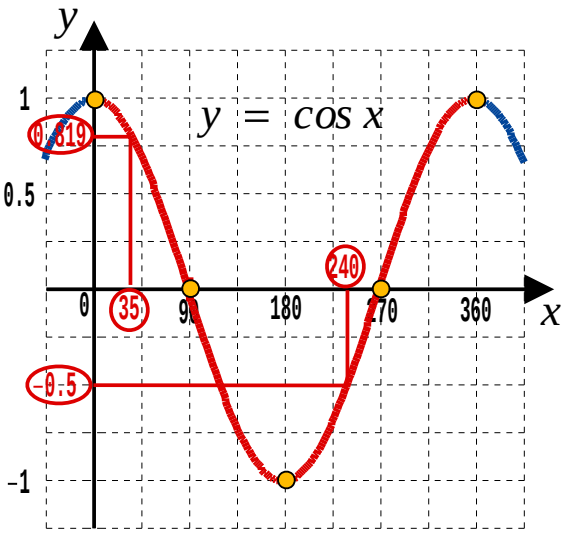
GCSE Mathematics
Non-Right Angled Trigonometry

Answer 1

(i) $y = 0.819$

(iii) $y = -0.5$

(ii) and **(iv)**



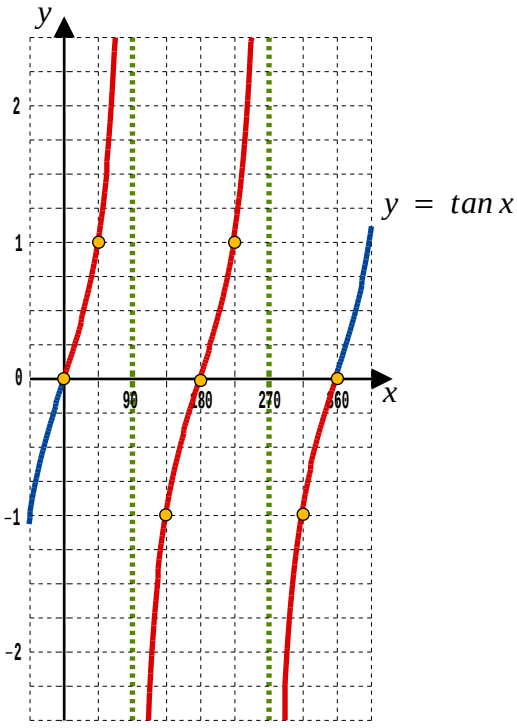
Answer 2

1.5459

Answer 3

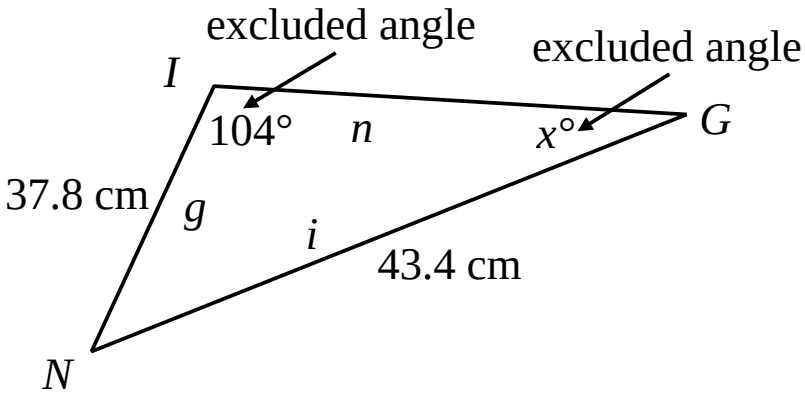
(i)	$A = 140.3°$	(1 decimal place asked for)
(ii)	$B = 76.2°$	(1 decimal place asked for)
(iii)	$x = 30.2$	(3 significant figures asked for)
(iv)	$x = 229$	(3 significant figures asked for)

Answer 4



Answer 5

(i) (ii) and **(iii)**



(iv)

$$\frac{\sin G}{g} = \boxed{\frac{\sin I}{i}} = \frac{\sin N}{n}$$

(v)

$$\begin{aligned} \sin G &= \frac{g \times \sin I}{i} \\ &= \frac{37.8 \times \sin 104}{43.4} \\ &= 0.845 \\ G &= \arcsin 0.845 \\ &= 57.7^\circ \quad \text{(3 significant answers asked for)} \end{aligned}$$

Answer 6

(i)

$$\begin{aligned} c^2 &= a^2 + b^2 - 2ab\cos C \\ &= 33^2 + 18^2 - 2 \times 33 \times 18 \times \cos 29 \\ &= 373.95 \\ c &= 19.3\,\text{cm} \quad \text{(units asked for)} \end{aligned}$$

(ii)

$$\begin{aligned} \text{Area } \Delta &= \frac{1}{2} a\, b \sin C \\ &= \frac{1}{2} \times 33 \times 18 \times \sin 29 \\ &= 144\,\text{cm}^2 \quad \text{(units asked for)} \end{aligned}$$

Answer 7

Let x be the angle opposite the longest side, in which case,

$$\begin{aligned} \cos x &= \frac{214^2 + 287^2 - 316^2}{2 \times 214 \times 287} \\ &= 0.230 \\ x &= \arccos 0.230 \\ &= 76.7^\circ \end{aligned}$$

Answer 8

(i) $\angle B = 78^\circ$

(ii) Sketch of triangle

(iii)

$$a = \frac{9.4 \times \sin 68}{\sin 78} = 8.91 \text{ cm} \quad (\text{This is } BC)$$

$$c = \frac{9.4 \times \sin 34}{\sin 78} = 5.37 \text{ cm} \quad (\text{This is } AB)$$

Answer 9

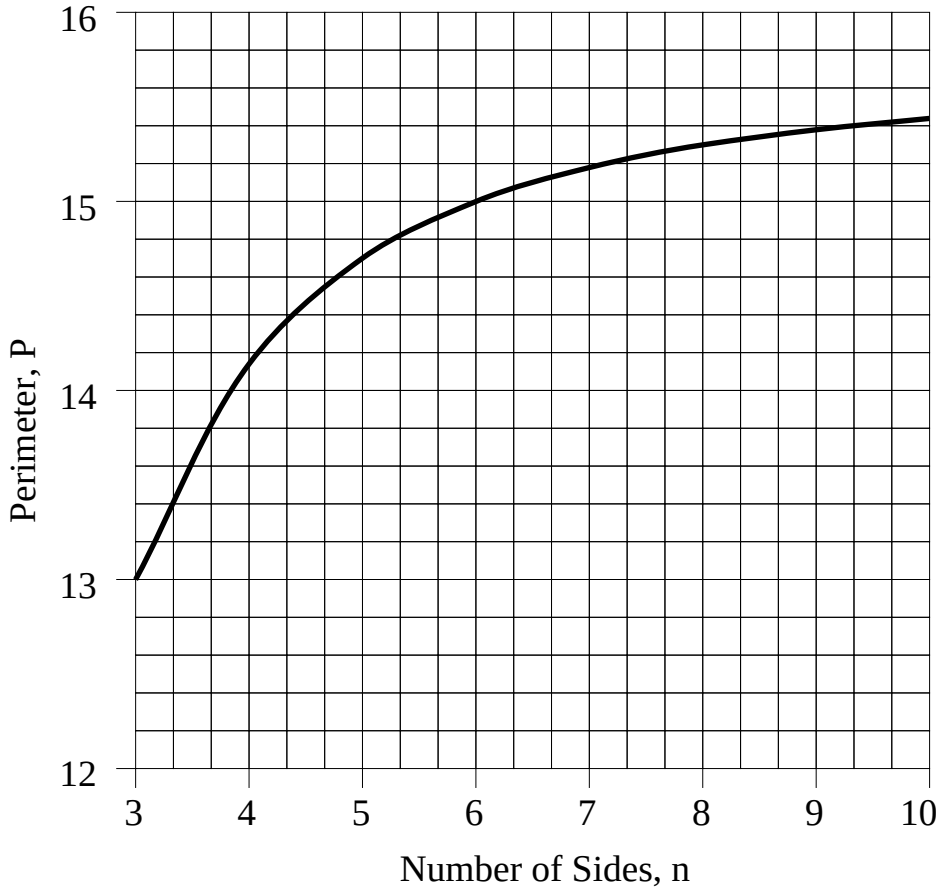
$$\begin{aligned} r^2 &= o^2 + c^2 - 2oc \cos R \\ &= 4.3^2 + 9.2^2 - 2 \times 4.3 \times 9.2 \times \cos 82 \\ &= 92.1 \\ r &= 9.6 \text{ cm} \end{aligned}$$

Answer 10

(i)

n	3	4	5	6	7	8	9	10
P	12.99	14.14	14.69	15.00	15.19	15.31	15.39	15.45

(ii)



(iii) As $n \to \infty$, the regular polygon becomes more like a circle.

$$C = 2\pi r$$

$$= 15.708... \text{ cm}$$

That is, $P \to 15.708...$ *as* $n \to \infty$

Answer 11

Strategy : the cosine rule avoids ambiguous case which occurs with the sine rule.

To get the length of the unknown side, u,

$$\begin{aligned} u^2 &= 18^2 + 26^2 - 2 \times 18 \times 26 \times \cos 40 \\ &= 283 \\ u &= 16.8 \text{ km} \end{aligned}$$

Now to get the angle inside the triangle, $W°$, near $x°$

$$\begin{aligned} \cos W &= \frac{16.8^2 + 18^2 - 26^2}{2 \times 16.8 \times 18} \\ &= -0.115 \\ W &= 96.6° \end{aligned}$$

So,

$$\begin{aligned} x &= 90 + 40 + 97 \\ &= 227° \end{aligned}$$

Answer 12

(i) Both $\frac{1}{2} ac \sin B$ and $\frac{1}{2} bc \sin A$ are the area of $\triangle ABC$

$\therefore$ They equal each other.

(ii)

$$\begin{aligned} \frac{1}{2} ac \sin B &= \frac{1}{2} bc \sin A \\ ac \sin B &= bc \sin A \\ a \sin B &= b \sin A \\ \frac{\sin A}{a} &= \frac{\sin B}{b} \end{aligned}$$

(iii)

$$\begin{aligned} \sin A &= \frac{26 \times \sin 62}{24} \\ &= 0.957 \\ A &= 73° \end{aligned}$$

(iv) 107° using symmetry of sine curve in mirror line at 90°