

11.2 Answers

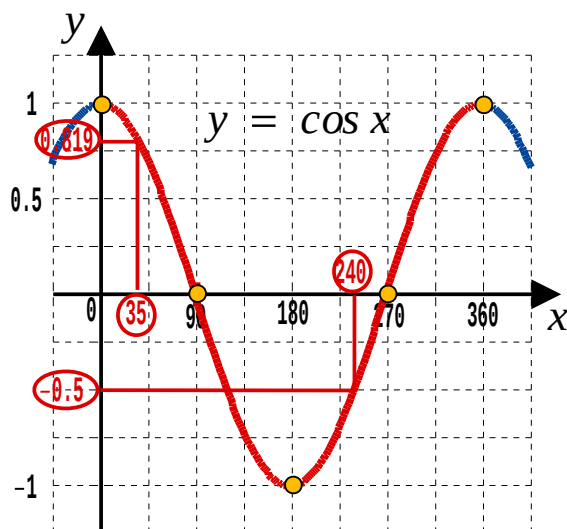
GCSE Mathematics Non-Right Angled Trigonometry

Answer 1

(i) $y = 0.819$

(iii) $y = -0.5$

(ii) and (iv)



Answer 2

1.5459

Answer 3

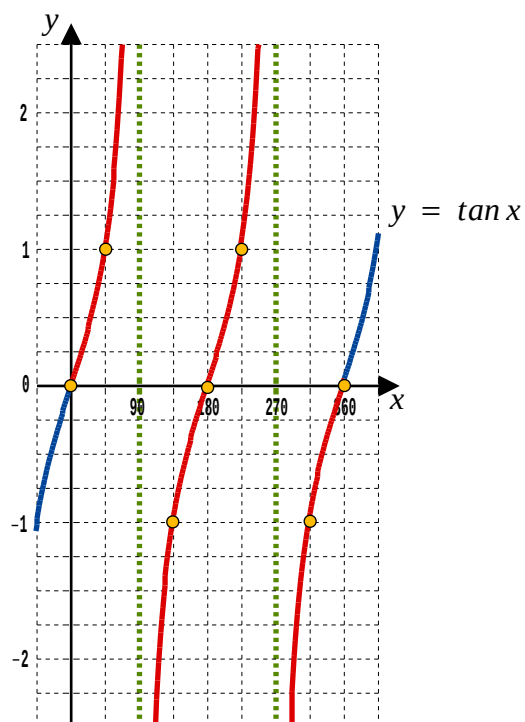
(i) $A = 140.3^\circ$ (1 decimal place asked for)

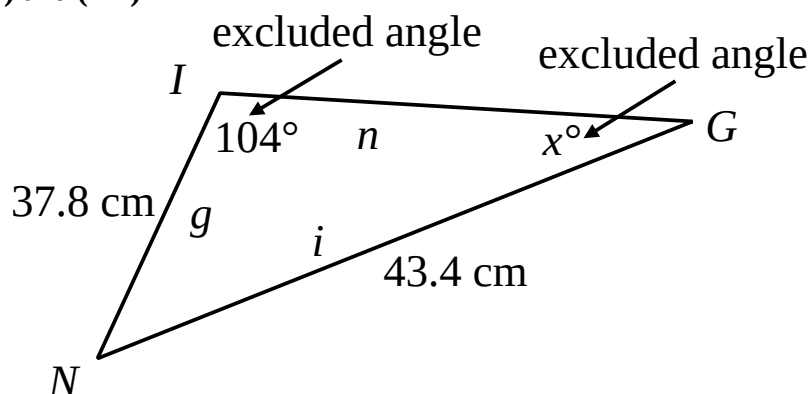
(ii) $B = 76.2^\circ$ (1 decimal place asked for)

(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)**

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

(v)

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

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)

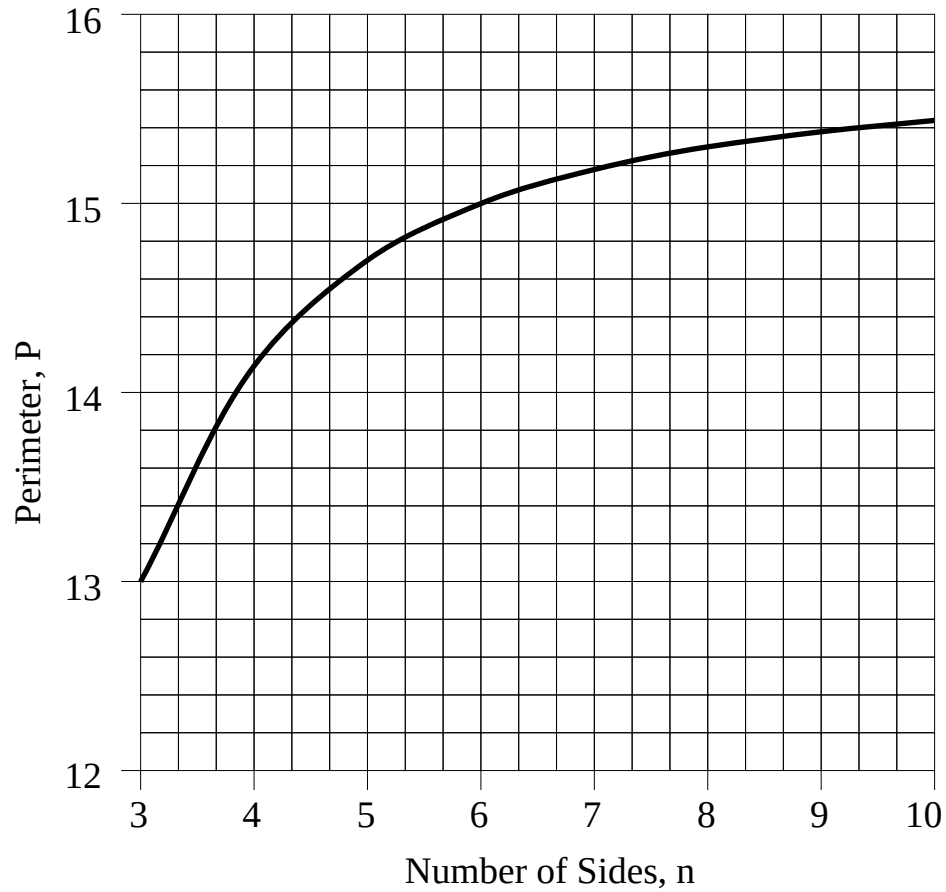
$$\begin{aligned}a &= \frac{9.4 \times \sin 68}{\sin 78} = 8.91 \text{ cm (This is } BC) \\ c &= \frac{9.4 \times \sin 34}{\sin 78} = 5.37 \text{ cm (This is } AB)\end{aligned}$$

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)**

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

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

$$C = 2\pi r$$

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

That is, $P \rightarrow 15.708... \text{ as } n \rightarrow \infty$

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°

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

So,

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

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)

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

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

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