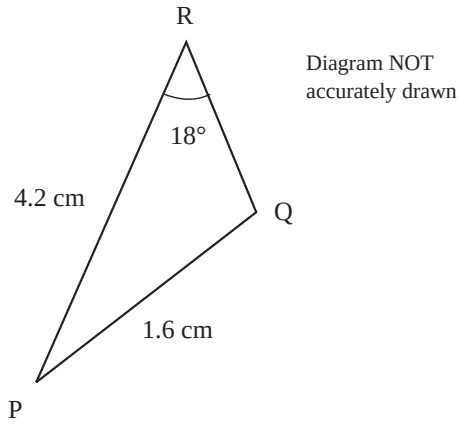
I Do

The diagram shows triangle PQR.



$PQ = 1.6$ cm $\quad PR = 4.2$ cm

Angle $PRQ = 18°$.

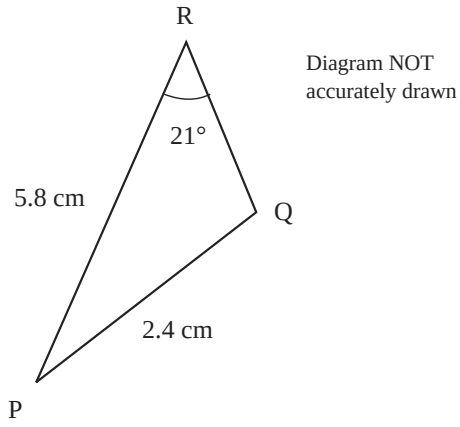
Given that angle PQR is obtuse,

work out the area of triangle PQR.

Give your answer correct to 3 significant figures.

We Do

The diagram shows triangle PQR.



$PQ = 2.4$ cm $\quad$ $PR = 5.8$ cm

Angle $PRQ = 21^\circ$.

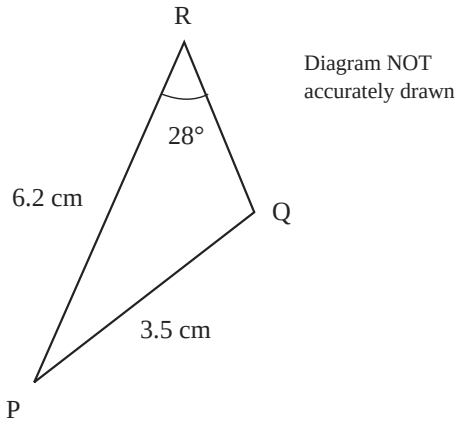
Given that angle PQR is obtuse,

work out the area of triangle PQR.

Give your answer correct to 3 significant figures.

You Do

The diagram shows triangle PQR.



$PQ = 3.5$ cm $\quad$ $PR = 6.2$ cm

Angle $PRQ = 28°$.

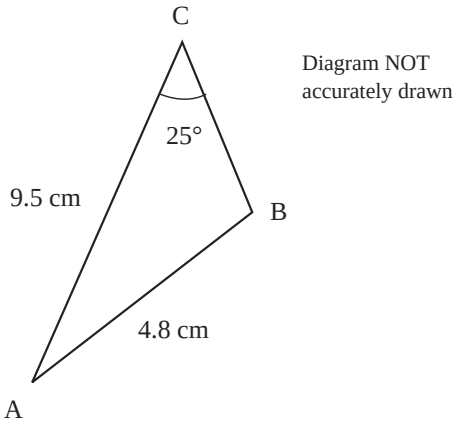
Given that angle PQR is obtuse,

work out the area of triangle PQR.

Give your answer correct to 3 significant figures.

Challenge 1

The diagram shows triangle ABC.



$AB = 4.8$ cm $\quad AC = 9.5$ cm

Angle $ACB = 25°$.

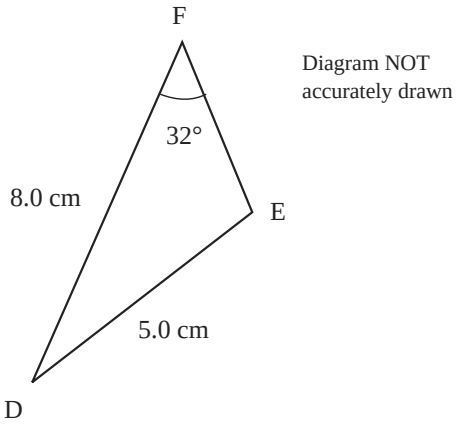
Given that angle ABC is obtuse,

work out the length of BC.

Give your answer correct to 3 significant figures.

Challenge 2

The diagram shows triangle DEF.



$DE = 5.0$ cm $\quad$ $DF = 8.0$ cm

Angle $DFE = 32°$.

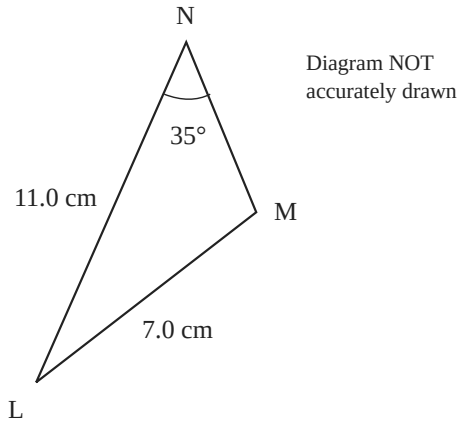
There are two possible triangles with these measurements.

Work out the difference between the two possible areas of triangle DEF.

Give your answer correct to 3 significant figures.

Challenge 3

The diagram shows triangle LMN.



$LM = 7.0 \text{ cm}$ $LN = 11.0 \text{ cm}$

Angle $LNM = 35°$.

The area of triangle LMN is greater than 20 cm².

Work out the length of MN.

Give your answer correct to 3 significant figures.

Answers & Worked Solutions

I Do

Keep full precision in calculations; displayed angles are rounded.

1. Use the Sine Rule: $\sin(Q) / 4.2 = \sin(18^\circ) / 1.6$.
2. $\sin(Q) = 0.81116961...$
3. The acute solution is $Q = \sin^{-1}(0.81116961...) = 54.21^\circ$.
4. Since PQR is obtuse, $Q = 180^\circ - 54.21^\circ = 125.79^\circ$.
5. $P = 180^\circ - 18^\circ - 125.79^\circ = 36.21^\circ$.
6. Area $= ½ \times 1.6 \times 4.2 \times \sin(P) = 1.98492543...$ cm^2.

Answer: 1.98 cm^2

We Do

Keep full precision in calculations; displayed angles are rounded.

1. Use the Sine Rule: $\sin(Q) / 5.8 = \sin(21^\circ) / 2.4$.
2. $\sin(Q) = 0.86605588...$
3. The acute solution is $Q = \sin^{-1}(0.86605588...) = 60.00^\circ$.
4. Since PQR is obtuse, $Q = 180^\circ - 60.00^\circ = 120.00^\circ$.
5. $P = 180^\circ - 21^\circ - 120.00^\circ = 39.00^\circ$.
6. Area $= ½ \times 2.4 \times 5.8 \times \sin(P) = 4.38039960...$ cm^2.

Answer: 4.38 cm^2

Answers & Worked Solutions

You Do

Keep full precision in calculations; displayed angles are rounded.

1. Use the Sine Rule: $\sin(Q) / 6.2 = \sin(28^\circ) / 3.5$.

2. $\sin(Q) = 0.83163534...$

3. The acute solution is $Q = \sin^{-1}(0.83163534...) = 56.27^\circ$.

4. Since PQR is obtuse, $Q = 180^\circ - 56.27^\circ = 123.73^\circ$.

5. $P = 180^\circ - 28^\circ - 123.73^\circ = 28.27^\circ$.

6. Area $= ½ \times 3.5 \times 6.2 \times \sin(P) = 5.13836986...$ cm^2.

Answer: 5.14 cm^2

Challenge 1

Keep full precision in calculations; displayed angles are rounded.

1. Use the Sine Rule: $\sin(B) / 9.5 = \sin(25^\circ) / 4.8$.

2. $\sin(B) = 0.83643198...$

3. The acute solution is $B = 56.77^\circ$.

4. ABC is obtuse, so $B = 180^\circ - 56.77^\circ = 123.23^\circ$.

5. $A = 180^\circ - 25^\circ - 123.23^\circ = 31.77^\circ$.

6. $BC / \sin(A) = 4.8 / \sin(25^\circ)$.

7. $BC = 4.8 \times \sin(A) / \sin(25^\circ) = 5.97918437...$ cm.

Answer: 5.98 cm

Answers & Worked Solutions

Challenge 2

Keep full precision in calculations; displayed angles are rounded.

1. Use the Sine Rule: $\sin(E) / 8.0 = \sin(32^\circ) / 5.0$.
2. $\sin(E) = 0.84787082...$
3. Acute E: $E = 57.98^\circ$, so $D = 180^\circ - 32^\circ - E = 90.02^\circ$.
4. Area 1 $= \frac{1}{2} \times 5.0 \times 8.0 \times \sin(D) = 19.99999888...$ cm^2.
5. Obtuse E: $E = 122.02^\circ$, so $D = 25.98^\circ$.
6. Area 2 $= \frac{1}{2} \times 5.0 \times 8.0 \times \sin(D) = 8.76141060...$ cm^2.
7. Difference $= 11.23858828...$ cm^2.

Answer: 11.2 cm^2

Challenge 3

Keep full precision in calculations; displayed angles are rounded.

1. Use the Sine Rule: $\sin(M) / 11.0 = \sin(35^\circ) / 7.0$.
2. $\sin(M) = 0.90133440...$
3. Acute M: $M = 64.33^\circ$, so $L = 80.67^\circ$.
4. Area 1 $= \frac{1}{2} \times 7.0 \times 11.0 \times \sin(L) = 37.99024347...$ cm^2 (> 20 cm^2).
5. Obtuse M: $M = 115.67^\circ$, so $L = 29.33^\circ$.
6. Area 2 $= 18.86116009...$ cm^2 (< 20 cm^2), so reject this triangle.
7. For the valid triangle, $MN / \sin(L) = 7.0 / \sin(35^\circ)$.
8. $MN = 7.0 \times \sin(L) / \sin(35^\circ) = 12.04253968...$ cm.

Answer: 12.0 cm