Solutions to Past Paper Questions – Sine and Cosine Rule

18) (a) Area = ½ × 7.2 × 8.35 × sin74° = 28.9cm^2 (3sf)

(b) AB^2 = 7.2^2 + 8.35^2 – 2 × 7.2 × 8.35 × cos74°
= 88.419...
AB = 9.40cm (3sf)

14) (a) $\frac{\sin ABC}{7.5} = \frac{\sin 30°}{8.1}$ ⇒ sin ABC = 0.46296 ⇒ ABC = 27.6° (3sf)

(b) angle BAC = 180 – 30 – 27.6 = 122.4°
Area = ½ × 8.1 × 7.5 × sin122.4° = 25.6 cm^2 (3sf)

16) (a) By cosine rule, AC^2 = 4.1^2 + 7.6^2 – 2×4.1×7.6×cos117°
AC^2 = 102.86
AC = 10.1cm (3sf)

(b) Area = ½ × 4.1 × 7.6 × sin117° = 13.9cm^2

(c) By sine rule in triangle ADC,

$$\frac{\sin D\hat{C}A}{5.4} = \frac{\sin 62°}{10.1}$$

$$\sin D\hat{C}A = \frac{5.4 \times \sin 62°}{10.1}$$

$$\sin D\hat{C}A = 0.4721$$

$$D\hat{C}A = 28.16°$$

$$D\hat{A}C = 180 - 28.16 - 62 = 89.84°$$

So area of triangle ADC = ½ × 5.4 × 10.1 × sin89.84° = 27.27 cm^2
Total area of quadrilateral = 13.9+27.27 = 41.2cm^2

12) (a) Area = ½ ×11.7 × 28.3 × sin67° = 152m^2 (3sf)

(b) AC^2 = 11.7^2 + 28.3^2 – 2 × 11.7 × 28.3 × cos67°
= 679.03
AC = 26.1cm (3sf)

20) Area of triangle = ½ × 60 × AC × sin 150° = 450 m^2
So AC = $\frac{450}{½ \times 60 \times \sin 150°}$ = 30 m
By cosine rule, AB^2 = 30^2 + 60^2 - 2 × 30 × 60 × cos 150°
AB^2 = 7617.69…
AB = 87.3m
So perimeter = 30 + 60 + 87.3 = 177m (3sf)