Area of Triangles
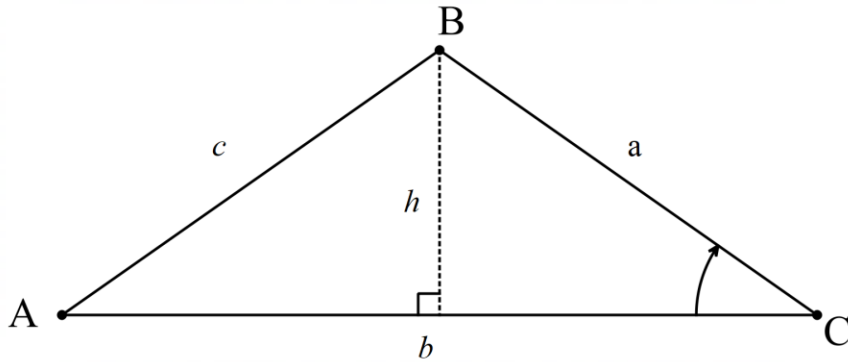
Given ANY triangle:

We know that $\sin C = \dfrac{h}{a}$, cross-multiplying we get that the height, h, is   h = a sin C

Since the area of a triangle is height times based divided by two,

We get: $\text{Area} = \dfrac{(a\sin C)(b)}{2}$

Or $\text{Area} = \dfrac{ab\sin C}{2}$

Looking at the original diagram we see that this involves multiplying two sides (a and b) times the sine of the CONTAINED angle (the angle between the two sides) and dividing by two. Generalizing, this means to find the area of any triangle (if we're not directly given the height and the base) we **NEED SAS** (side-angle-side).
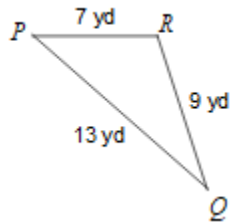
Case 1: SAS
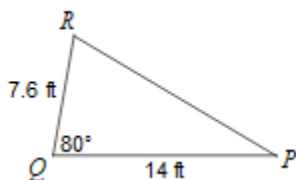
$Area = \dfrac{7.6(14)(\sin 80^\circ)}{2}$

$= 52.4 \; yd^2$

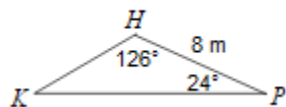| Case 2: SSS | Use law of cosines to solve for an angle, then you have SAS (see Case 1) (Answer: 30.0 yd^2) |

P ─ 7 yd ─ R, 9 yd, 13 yd, Q

| Case 3: AAS | Use law of sines to get side KP, subtract to get angle P, then you have SAS (see Case 1) (Answer: 5.1 cm^2) |

H, 28°, 6 cm, 121°, K, P
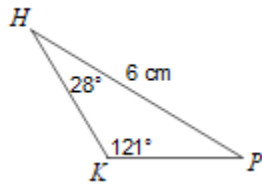
| Case 4: ASA | Subtract to get angle K, use sine law to get side KH or side KP, then you have SAS (see Case 1)   (Answer: 21.0 m^2) |

H, 126°, 8 m, 24°, K, P

| Case 5: SSA | Use sine law to get angle P, then subtract to get angle R, then you have SAS (see Case 1) (Answer: 47.9 yd^2) |

R ─ 10.2 yd ─ Q, 99°, 15 yd, P