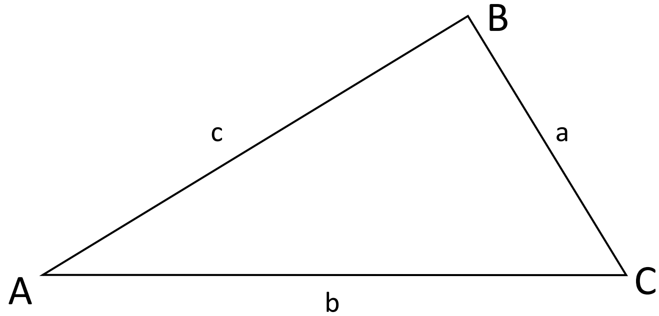
College Review Math
Section 9B

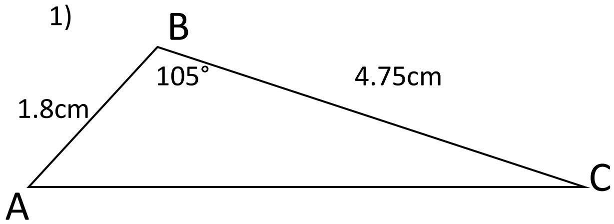


Formulas for the area (K) of a triangle without the height given:

$$K = \frac{1}{2}ab\sin C \quad \text{or} \quad K = \frac{1}{2}bc\sin A \quad \text{or} \quad K = \frac{1}{2}ac\sin B$$

Examples:

1)

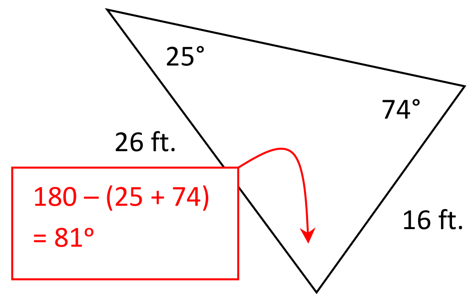


Formula: K = 1/2ac sin B

Answer: K = 1/2(4.75)(1.8)sin105

K ≈ 4.1 cm^2

2)



Formula: K = 1/2(side)(side) sin (included angle)

Answer: K = 1/2(26)(16)sin81

K ≈ 205.4 ft^2

3) In ΔBEN, b = 9, n = 7, $\angle E = 40°$

K = 1/2bn sin E

K = 1/2(9)(7)sin40

K ≈ 20.2 $units^2$

4a) In ΔRAT, a = 6, t = 20, $\angle R = 50°$

4b) In ΔRAT, a = 6, t = 20, $\angle R = 130°$

K = 1/2at sin R

K = 1/2(6)(20)sin50

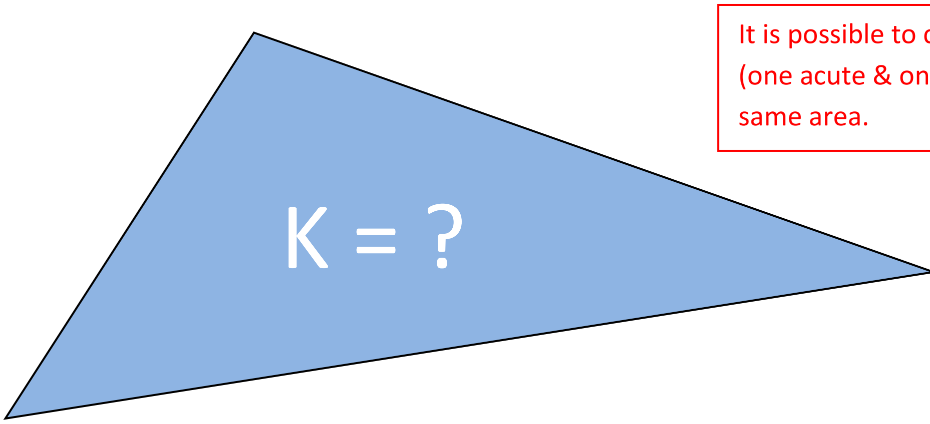
K ≈ 46.0 $units^2$

K = 1/2at sin R

K = 1/2(6)(20)sin130

K ≈ 46.0 $units^2$

It is possible to construct two triangles (one acute & one obtuse) that have the same area.



Examples (given the area):

1) The area of ΔPQR = 15. If p = 5 and q = 10, find all possible measurements for $\angle R$.

K = 1/2pq sin R
15 = 1/2(5)(10)sin R
15 = 25sin R
15/25 = sin R
$\sin^{-1}$(15/25) = R R = 36.9°

Since there is an obtuse triangle with equal area…
180 – 36.9 = 143.1
R = 143.1° or 36.9°

2) The area of ΔDUM = 8. If d = 12.8 and m = 2.5, find all possible measurements for $\angle U$.

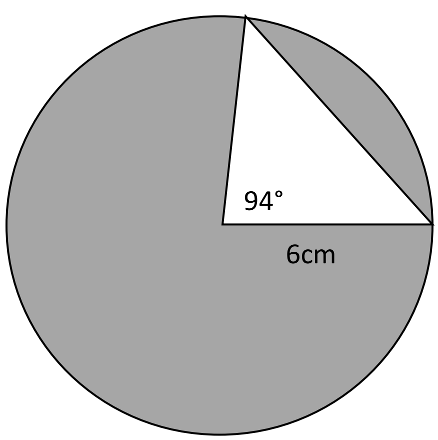
K = 1/2dm sin U
8 = 1/2(12.8)(2.5)sin U
8 = 16sin U
8/16 = sin U
$\sin^{-1}$(8/16) = U U = 30°

Since there is an obtuse triangle with equal area…
180 – 30 = 150
R = 150° or 30°

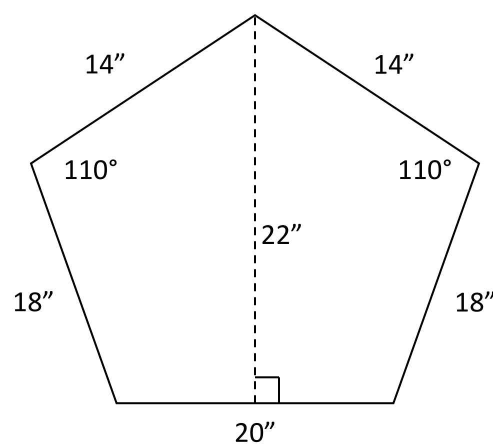
LET’S FRY IT!

Round answers to three significant digits.

3) Find the area of the shaded region.

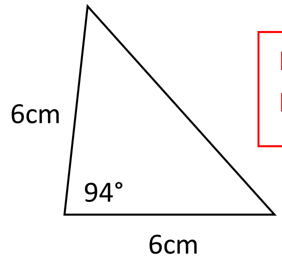


4) Find the area of the pentagon shown.



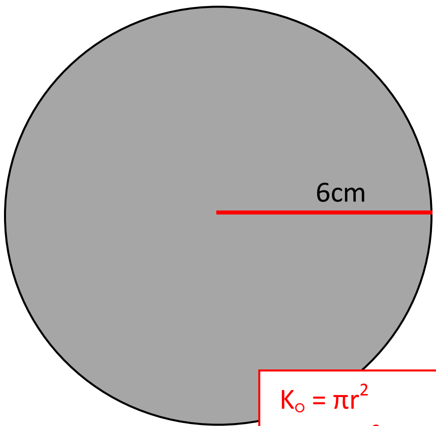
See next page.

3)



$K_\Delta = 1/2(6)(6)\sin 94$

$K_\Delta \approx 18 \text{ cm}^2$



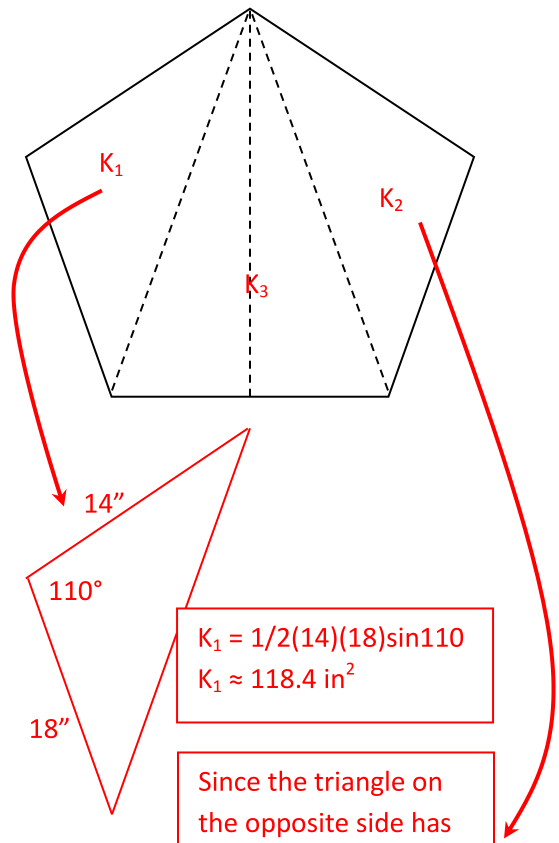
$K_\circ = \pi r^2$

$K = \pi(6)^2$

$K \approx 113.1 \text{ cm}^2$

The area of the original shaded region would be the circle's area minus the triangle's area, or 113.1 – 18 ≈ 95.1 cm^2

4)

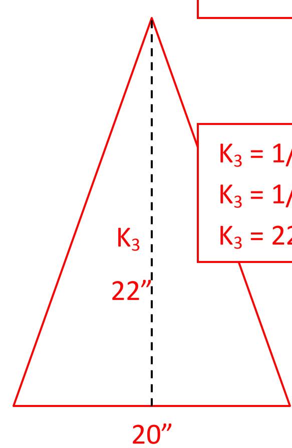


$K_1 = 1/2(14)(18)\sin 110$

$K_1 \approx 118.4 \text{ in}^2$

Since the triangle on the opposite side has the same measures

$K_2 \approx 118.4 \text{ in}^2$



$K_3 = 1/2bh$

$K_3 = 1/2(20)(22)$

$K_3 = 220 \text{ in}^2$

Total area for the original shape = 118.4 + 118.4 + 220 = 456.8 cm^2