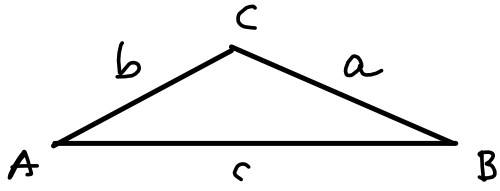
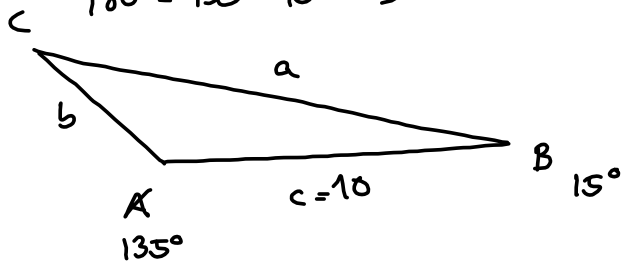
Sinussetningen

$$\frac{\sin A}{a} = \frac{\sin B}{b} = \frac{\sin C}{c}$$



Eksempel

$180° - 135° - 15° = 30°$



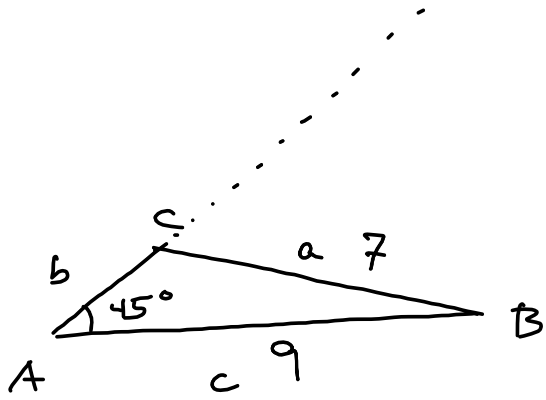
$$a \frac{\sin C}{c} = \sin A$$

$$a = \frac{c}{\sin C} \cdot \sin A = 10 \frac{\sin 135°}{\sin 30°}$$

$$= 10\left(\frac{1/\sqrt{2}}{1/2}\right) = 10 \cdot \left(\frac{2}{\sqrt{2}}\right) = 10 \cdot \sqrt{2} = \underline{14.1}$$

$$b = \frac{c}{\sin C} \cdot \sin B = 10 \cdot \frac{\sin(15°)}{\sin(30°)} = \underline{5.2}$$

Eksempel



Hva er vinkel C ?

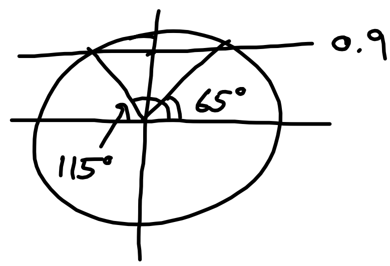
$$\frac{\sin A}{a} = \frac{1/\sqrt{2}}{7} = \frac{1}{7\cdot\sqrt{2}} = \frac{\sin B}{b} = \frac{\sin C}{c}$$

$$\sin C = c \cdot \frac{\sin A}{a} = 9 \cdot \frac{1}{7\sqrt{2}} = 0.909\ldots$$

$$C = \arcsin(0.909) = \underline{65.4^\circ}$$

En annen løsning i intervallet $[0, 180^\circ]$ er

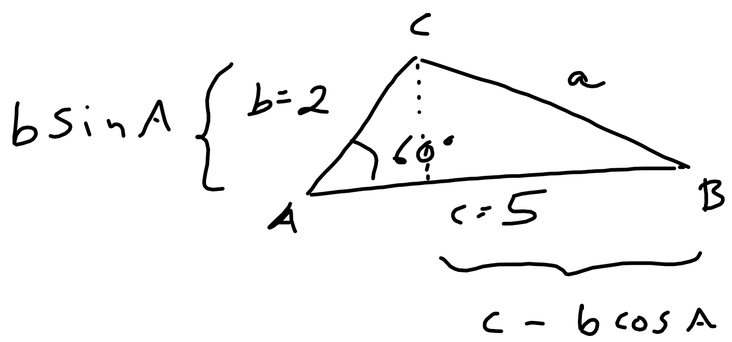
$$180^\circ - 65.4^\circ = \underline{114.6^\circ}$$



$$B = 180^\circ - A - C$$

$$b = \sin B \cdot \frac{a}{\sin A}$$

Cosinussetningen



$0 < \cos A$ for $0 < A < 90°$

$0 > \cos A$ for $90° < A < 180°$

Pytagoras : $(c - b\cos A)^2 + (b\sin A)^2 = a^2$

$$c^2 + (-b\cos A)^2 - 2bc\cos A + (b\sin A)^2 = a^2$$

$$c^2 + b^2(\underbrace{\cos^2 A + \sin^2 A}_{1 \text{ for alle } A}) - 2bc\cos A = a^2$$

Kosinussetningen $\boxed{b^2 + c^2 - 2bc\cos A = a^2}$

I eksempelet ovenfor

$$2^2 + 5^2 - 2\cdot 2\cdot 5\cos(60°) = a^2$$

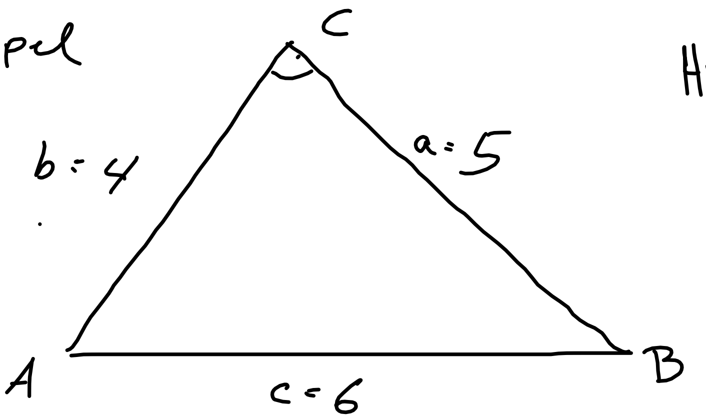
$$4 + 25 - 20\cdot\frac{1}{2} = 19 = a^2$$

$$a = \sqrt{19} \sim \underline{4.35}$$

Når $A = 90°$ reduseres cosinussetningen til pytagoras setning. $(\cos 90° = 0)$

Eksempel

Hva er C?



$$a^2+b^2-2ab\cdot\underline{\cos C} = c^2$$

ukjent

$$5^2+4^2-2\cdot5\cdot4\cdot\cos C = 6^2$$

$$25+16-40\cos C = 36$$

$$25+16-36 = 5 = 40\cos C$$

$$\cos(C) = \frac{5}{40} = \frac{1}{8}$$

$$C = \arccos\left(\frac{1}{8}\right) = \underline{\underline{82.8^\circ}}$$