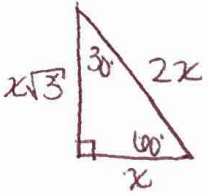


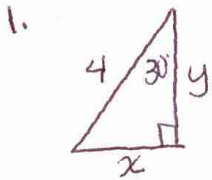
Test Notes

Special right triangles

30-60-90

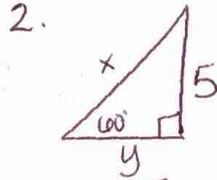


examples



$$x = 2$$

$$y = 2\sqrt{3}$$

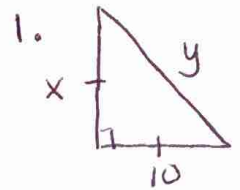
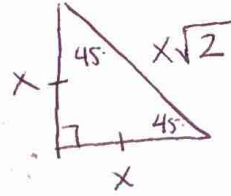


$$5 = y\sqrt{3}$$

$$\frac{5}{\sqrt{3}} = y$$

$$\frac{5\sqrt{3}}{3} = y \quad \frac{10\sqrt{3}}{3} = x$$

45-45-90



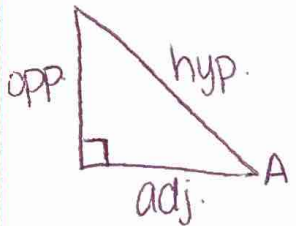
$$x = 10$$

$$y = 10\sqrt{2}$$

SOH-CAH-TOA ← right As

examples

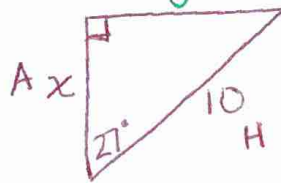
1. solving for a side



$$\sin A = \frac{\text{opp}}{\text{hyp}}$$

$$\cos A = \frac{\text{adj}}{\text{hyp}}$$

$$\tan A = \frac{\text{opp}}{\text{adj}}$$

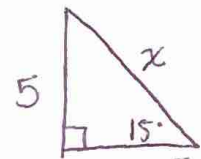


$$\cos 27 = \frac{x}{10} \quad \text{exact}$$

$$10 \cos 27 = x$$

$$8.9 = x \quad \text{approx.}$$

2. solve for a side



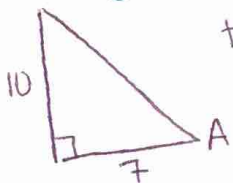
$$\sin 15 = \frac{5}{x}$$

$$x \sin 15 = 5 \quad \text{exact}$$

$$x = \frac{5}{\sin 15} \quad \text{approx.}$$

$$x = 19.3 \quad \text{approx.}$$

3. solving for an angle

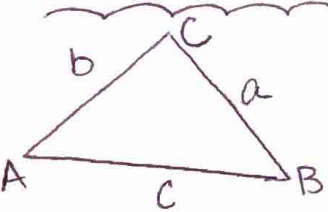


$$\tan A = \frac{10}{7}$$

$$\tan^{-1}(\frac{10}{7}) = A \quad \text{exact}$$

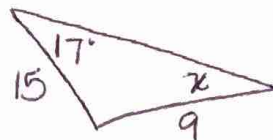
$$\angle A = 55^\circ \quad \text{approx.}$$

Law of sines ← non right As



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

2. solving for an angle



$$\frac{\sin 17}{9} = \frac{\sin x}{15}$$

$$15 \sin 17 = 9 \sin x$$

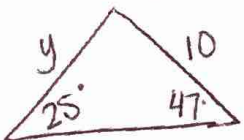
$$\frac{15 \sin 17}{9} = \sin x$$

$$x = \sin^{-1}(\frac{15 \sin 17}{9}) \quad \text{exact}$$

$$\angle x = 29.2^\circ \quad \text{approx.}$$

examples

1. side length solving



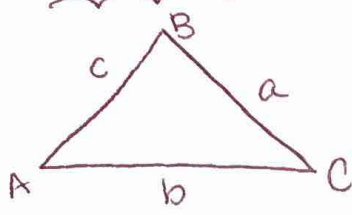
$$\frac{\sin 25}{10} = \frac{\sin 47}{y}$$

$$y \sin 25 = 10 \sin 47$$

$$y = \frac{10 \sin 47}{\sin 25} \quad \text{exact approx.}$$

$$y = 17.3$$

Law of Cosines ← non right Δs with SAS & SSS

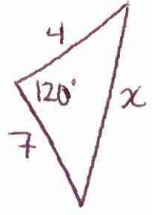


$$c^2 = a^2 + b^2 - 2(a)(b) \cos C$$

↑ main side ↑ other sides ↑ angle opp. main side

examples

1. find a side length



$$x^2 = 4^2 + 7^2 - 2(4)(7) \cos 120$$

$$x^2 = 16 + 49 - 56 \cos 120$$

cannot combine these 3 #s, only the 1st 2 #s

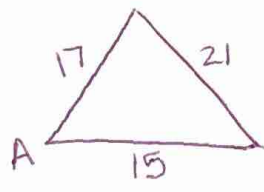
$$x^2 = 65 - 56 \cos 120$$

$$x^2 = 65 + 28$$

$$x^2 = 93$$

$$x = 9.6$$

2. find an angle



$$21^2 = 17^2 + 15^2 - 2(17)(15) \cos A$$

$$441 = 289 + 225 - 510 \cos A$$

cannot combine all 3 #s, only 289 + 225

$$441 = 514 - 510 \cos A$$

$$-73 = -510 \cos A$$

$$0.143 = \cos A$$

$$\cos^{-1}(0.143) = A$$

$$81.8^\circ = A$$

extra help

- * solving the Δ means finding all missing lengths & angles
- * the angles in a Δ add up to 180°
- * when rationalizing/simplifying radicals you want to look for perfect squares & no √ in the denominator.

examples

- $$\sqrt{\frac{7}{2}} \cdot \sqrt{\frac{4}{6}} = \sqrt{\frac{28}{12}} = \frac{\sqrt{28}}{\sqrt{12}} = \frac{\sqrt{4} \sqrt{7}}{\sqrt{4} \sqrt{3}} = \frac{2\sqrt{7}}{2\sqrt{3}} = \frac{\sqrt{7}}{\sqrt{3}} \left(\frac{\sqrt{3}}{\sqrt{3}} \right) = \frac{\sqrt{21}}{3}$$
- $$\frac{10}{\sqrt{5}} \left(\frac{\sqrt{5}}{\sqrt{5}} \right) = \frac{10\sqrt{5}}{5} = 2\sqrt{5}$$
- $$\frac{2\sqrt{3}}{\sqrt{6}} \left(\frac{\sqrt{6}}{\sqrt{6}} \right) = \frac{2\sqrt{18}}{6} = \frac{2\sqrt{9} \sqrt{2}}{6} = \frac{2(3)\sqrt{2}}{6} = \frac{6\sqrt{2}}{6} = \sqrt{2}$$