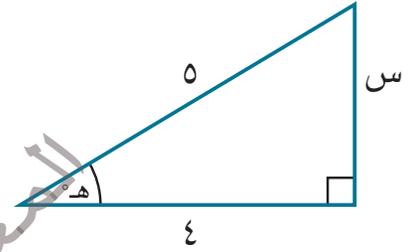


الوحدة الثانية: حلول التمارين

حساب المثلثات

تمارين ١-٢

(١) استخدم المثلث الآتي:



$$3 = \sqrt{4^2 + 3^2} = 5$$

أ) جاه = $\frac{3}{5}$ ب) ظاه = $\frac{4}{5}$

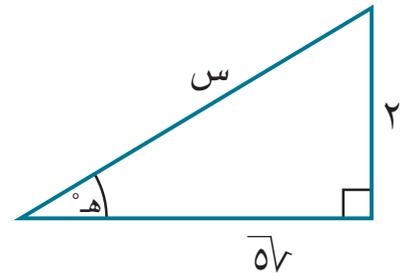
ج) $2 \text{ جاه} \times \text{جاه} = \frac{3}{5} \times \frac{4}{5} \times 2 = \frac{24}{25}$

د) $\frac{20}{3} = \frac{5}{3} = \frac{5}{4}$ ظاه

هـ) $\frac{4}{5} = \frac{16}{25} = \frac{(2)^2 - 1}{(5)^2 - 1} = \frac{1 - \text{جاه}^2}{\text{جاه}^2}$

و) $\frac{12}{19} = \frac{12}{19} = \frac{2-3}{3+2} = \frac{\text{جاه} - 3}{\text{جاه} + 2}$

(٢) استخدم المثلث الآتي:



$$3 = \sqrt{(5\sqrt)^2 + 2^2} = 5\sqrt$$

أ) جاه = $\frac{2}{3}$ ب) جاه = $\frac{5\sqrt}{3}$

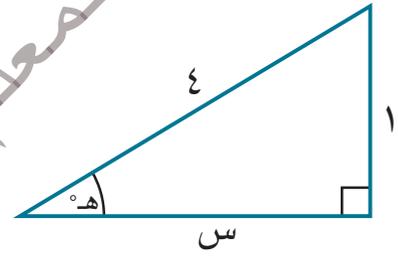
$$\text{ج} \quad 1 = \frac{5}{9} + \frac{4}{9} = \sqrt{\left(\frac{5\sqrt{3}}{3}\right)^2} + \sqrt{\left(\frac{2}{3}\right)^2} = \text{جتا}^2 \text{هـ} + \text{جتا}^2 \text{هـ}$$

$$\text{د} \quad \frac{\sqrt{5}}{2} = \frac{\frac{5\sqrt{3}}{2}}{\frac{2}{3}} = \frac{\text{جتاه}}{\text{جاه}}$$

$$\text{هـ} \quad \frac{7}{5} = \frac{2}{\frac{5}{3}} = \frac{2}{\frac{2}{3} + 1} = \frac{2}{\text{جاه} + 1}$$

$$\text{و} \quad \frac{(\sqrt{5}-3)15}{4} = \frac{\sqrt{5}-3}{\sqrt{5}-3} \times \frac{15}{\sqrt{5}+3} = \frac{15}{\sqrt{5}+3} = \frac{5}{\frac{\sqrt{5}+3}{3}} = \frac{5}{\frac{\sqrt{5}}{3} + 1} = \frac{5}{\text{جتاه} + 1}$$

(3) استخدم المثلث الآتي:



$$\sqrt{15} = \sqrt{1^2 + s^2} = s$$

$$\text{أ} \quad \frac{\sqrt{15}}{4} = \text{جتاه}$$

$$\text{ب} \quad \frac{\sqrt{15}}{15} = \frac{\sqrt{15}}{15} \times \frac{1}{\sqrt{15}} = \frac{1}{15\sqrt{15}} = \text{ظاه}$$

$$\text{ج} \quad 1 - \text{جا}^2 \text{هـ} = 1 - \left(\frac{1}{4}\right)^2 = \frac{15}{16}$$

$$\text{د} \quad \frac{15}{16} = \frac{\frac{\sqrt{15}}{4}}{\frac{1}{15\sqrt{15}}} = \frac{\sqrt{15}}{4} \times \frac{1}{\frac{1}{15\sqrt{15}}} = \frac{\text{جاه} \times \text{جتاه}}{\text{ظاه}}$$

$$\text{هـ} \quad \sqrt{5} + 4 = \frac{1}{\frac{1}{4}} + \frac{1}{\frac{1}{15\sqrt{15}}} = \frac{1}{\text{جاه}} + \frac{1}{\text{ظاه}}$$

$$\text{و} \quad \frac{\sqrt{5}4 - 75}{15} = \frac{\sqrt{15}}{15\sqrt{15}} \times \frac{4 - \sqrt{15}5}{\sqrt{15}} = \frac{4 - \sqrt{15}5}{15\sqrt{15}} = \frac{4}{15\sqrt{15}} - 5 = \frac{1}{\frac{15\sqrt{15}}{4}} - 5 = \frac{\text{ظاه}}{\text{جاه}} - 5$$

من المعتاد إنطاق المقامات العددية

(٤) استخدم:

المثلث ١: زواياه ٩٠° ، ٤٥° ، ٤٥° المثلث ٢: زواياه ٩٠° ، ٦٠° ، ٣٠°

$$\frac{1}{4} = \frac{1}{2} \times \frac{1}{2} \quad \text{أ}$$

ب جاس \times جاس = جاس

$$\frac{1}{2} = \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}}$$

$$\frac{\sqrt{2} + \sqrt{2}}{2} = \frac{\sqrt{2} + \sqrt{2}}{4} = \frac{\sqrt{2}}{2} = \frac{\sqrt{2} + 2}{\sqrt{2} + 2} \times \frac{\sqrt{2} + 2}{\sqrt{2} + 2} = \frac{\sqrt{2}}{2} + \frac{1}{\sqrt{2}} \quad \text{ج}$$

$$\sqrt{2} = \frac{\frac{\sqrt{2}}{2}}{\frac{1}{2}} \quad \text{د}$$

$$\frac{\sqrt{2} - 2}{2} = \frac{\sqrt{2} - 2}{\sqrt{2} - 2} \times \frac{1}{\sqrt{2} + 2} = \frac{\left(\frac{1}{\sqrt{2}}\right)}{\sqrt{2} + 2} \quad \text{هـ}$$

$$1 = \frac{1}{1} = \frac{\left(\frac{\sqrt{2}}{2}\right) + \left(\frac{1}{2}\right)}{\frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}} \times 2} \quad \text{و}$$

$$\frac{1}{2} = \frac{1}{\sqrt{2}} \times \frac{1}{\sqrt{2}} \quad \text{أ (٥)}$$

$$\frac{1}{4} = \left(\frac{1}{2}\right) \quad \text{ب}$$

$$\frac{1}{2} = \frac{1}{2} \times \frac{1}{2} \times 2 - 1 \quad \text{ج}$$

$$\frac{\sqrt{2} - \sqrt{2}}{2} = \frac{\sqrt{2}}{\sqrt{2}} \times \frac{\sqrt{2} - 1}{\sqrt{2}} = \frac{\sqrt{2} - 1}{\sqrt{2}} = \left(\frac{\sqrt{2} - 1}{2}\right) \sqrt{2} = \frac{\sqrt{2} - 1}{\frac{1}{\sqrt{2}}} \quad \text{د}$$

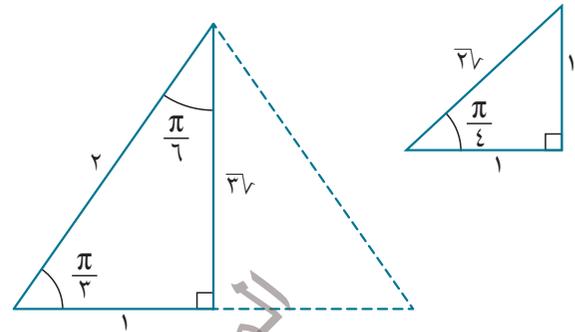
$$1 = 2 - 1 = \frac{1}{\frac{1}{2}} - \frac{1}{2} \quad \text{هـ}$$

$$\frac{\sqrt{2} + 2}{3} = \frac{4 + \sqrt{2}}{6} = \frac{2}{\sqrt{2}} \times \frac{2 + \sqrt{2}}{\sqrt{2}} = \frac{\frac{1}{\sqrt{2}} + \frac{1}{2}}{\frac{1}{\sqrt{2}}} \quad \text{و}$$

$\frac{\pi}{6} = \text{هـ}$	$\frac{\pi}{3} = \text{هـ}$	$\frac{\pi}{4} = \text{هـ}$	
$\frac{1}{\sqrt{3}}$	$\frac{1}{\sqrt{2}}$	$\frac{1}{\sqrt{2}}$	ظاهر
$\frac{\sqrt{3}}{2}$	$\frac{1}{2}$	$\frac{1}{\sqrt{2}}$	جناح
2	$\frac{2}{\sqrt{3}}$	$\sqrt{2}$	$\frac{1}{\text{جاء}}$

٦) يساعد المثلثان الخاصان على تكملة الجدول.

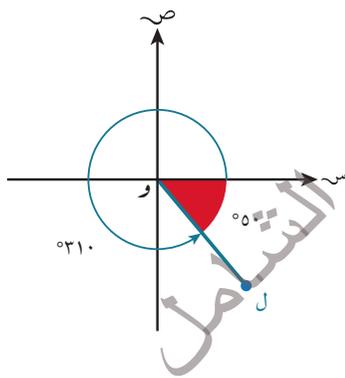
علم الطلبة أن القيم الحقيقية لعناصر المثلث مفيدة.



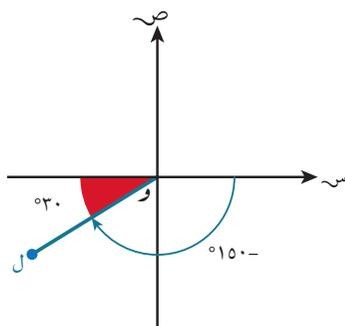
تمارين ٢-٢

تسمى الزاوية الحادة المحصورة مع المحور السيني زاوية الأساس أو الزاوية المرجعية.

ج) زاوية الأساس 50°



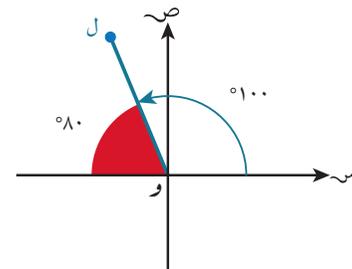
د) زاوية الأساس 30°



١) أ) $180^\circ - 110^\circ = 70^\circ$ ب) $360^\circ - 320^\circ = 40^\circ$

ج) $200^\circ - 180^\circ = 20^\circ$ د) $360^\circ \times \frac{3}{4} - 500^\circ = 40^\circ$

٢) أ) زاوية الأساس 80°



ب) زاوية الأساس 80°

