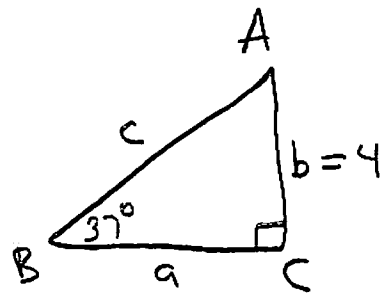


# Math 1113 Sample Test 4 Solutions

1)  $A = 53^\circ$       $a = 5.31$   
 $B = 37^\circ$       $b = 4$   
 $C = 90^\circ$       $c = 6.65$



$$A = 180^\circ - 90^\circ - 37^\circ = 53^\circ$$

$$\sin 37^\circ = \frac{4}{c} \quad \left| \quad \tan 37^\circ = \frac{4}{a}\right.$$

$$c = \frac{4}{\sin 37^\circ} = 6.65 \quad \left| \quad a = \frac{4}{\tan 37^\circ} = 5.31\right.$$

2)  $(\sqrt{13})^2 = 2^2 + x^2$   
 $x^2 = 9 \quad x = 3$

$\sin \theta = \frac{2}{\sqrt{13}} \cdot \frac{\sqrt{13}}{\sqrt{13}} = \frac{2\sqrt{13}}{13}$       $\csc \theta = \frac{\sqrt{13}}{2}$

$\cos \theta = \frac{3}{\sqrt{13}} \cdot \frac{\sqrt{13}}{\sqrt{13}} = \frac{3\sqrt{13}}{13}$       $\sec \theta = \frac{\sqrt{13}}{3}$

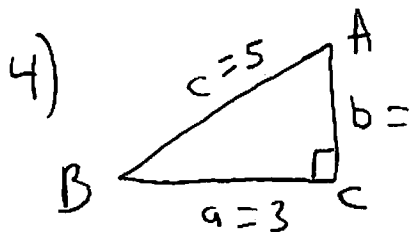
$\tan \theta = \frac{2}{3}$       $\cot \theta = \frac{3}{2}$

3)  $A = 56^\circ$       $a = 8.9$   
 $B = 34^\circ$       $b = 6$   
 $C = 90^\circ$       $c = 10.73$

$$A = 180^\circ - 90^\circ - 34^\circ = 56^\circ$$

$$\sin 34^\circ = \frac{6}{c} \quad \left| \quad \tan 34^\circ = \frac{6}{a}\right.$$

$$c = \frac{6}{\sin 34^\circ} = 10.73 \quad \left| \quad a = \frac{6}{\tan 34^\circ} = 8.9\right.$$



$$A = 36,87^\circ$$

$$B = 53,13^\circ$$

$$C = 90^\circ$$

$$a = 3$$

$$b = 4$$

$$c = 5$$

$$5^2 = x^2 + 3^2$$

$$25 = x^2 + 9$$

$$16 = x^2$$

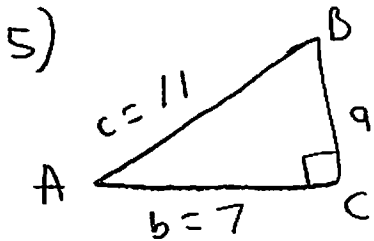
$$\underline{x = 4}$$

$$\cos B = \frac{3}{5}$$

$$A = 180^\circ - 90^\circ - 53,13^\circ$$

$$B = \cos^{-1}\left(\frac{3}{5}\right) = 53,13^\circ$$

$$A = 36,87^\circ$$



$$A = 50,48^\circ$$

$$B = 39,52^\circ$$

$$C = 90^\circ$$

$$a =$$

$$b = 7$$

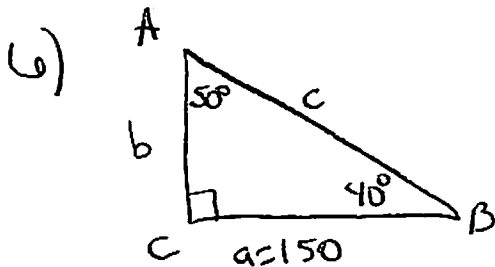
$$c = 11$$

$$\cos A = \frac{7}{11}$$

$$B = 180^\circ - 90^\circ - 50,48^\circ$$

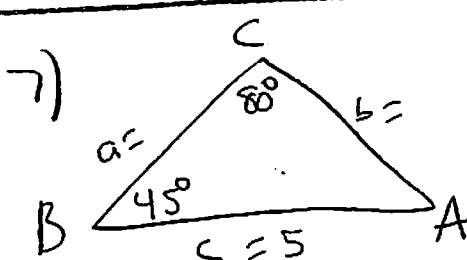
$$A = \cos^{-1}\left(\frac{7}{11}\right) = 50,48^\circ$$

$$B = 39,52^\circ$$



$$\tan 40^\circ = \frac{b}{a} = \frac{b}{150}$$

$$b = 150(\tan 40^\circ) = 125,86$$



(AAS)

$$A = 180^\circ - 45^\circ - 80^\circ = 55^\circ$$

$$B = 45^\circ$$

$$C = 80^\circ$$

$$a = 4,16$$

$$b = 3,59$$

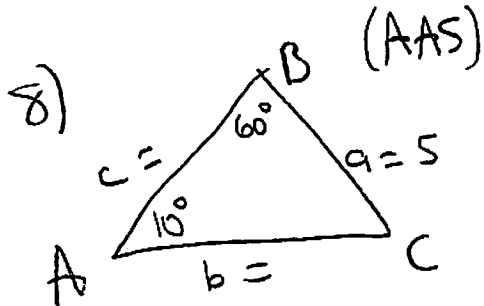
$$c = 5$$

$$\frac{\sin 80^\circ}{5} = \frac{\sin 45^\circ}{b}$$

$$b = \frac{5 \sin 45^\circ}{\sin 80^\circ} = 3,59$$

$$\frac{\sin 80^\circ}{5} = \frac{\sin 55^\circ}{a}$$

$$a = \frac{5 \sin 55^\circ}{\sin 80^\circ} = 4,16$$



$$A = 10^\circ$$

$$a = 5$$

$$B = 60^\circ$$

$$b = \boxed{24,94}$$

$$C = 180^\circ - 10^\circ - 60^\circ = \boxed{110^\circ}$$

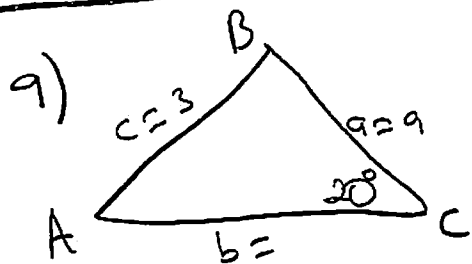
$$c = \boxed{27,06}$$

$$\frac{\sin 10^\circ}{5} = \frac{\sin 60^\circ}{b}$$

$$\frac{\sin 10^\circ}{5} = \frac{\sin 110^\circ}{c}$$

$$b = \frac{5 \sin 60^\circ}{\sin 10^\circ} = \boxed{24,94}$$

$$c = \frac{5 \sin 110^\circ}{\sin 10^\circ} = \boxed{27,06}$$



$$A =$$

$$a = 9$$

$$B =$$

$$b =$$

$$C = 20^\circ$$

$$c = 3$$

$$\frac{\sin 20^\circ}{3} = \frac{\sin A}{9}$$

no triangle

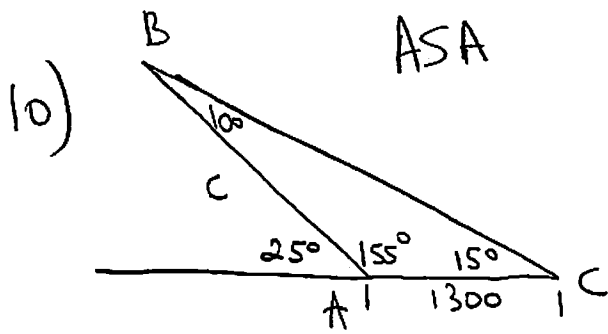
$$\sin A = \frac{9 \sin 20^\circ}{3}$$

$$A = \sin^{-1}\left(\frac{9 \sin 20^\circ}{3}\right)$$

$$A = \sin(1,02)$$

A = no solution

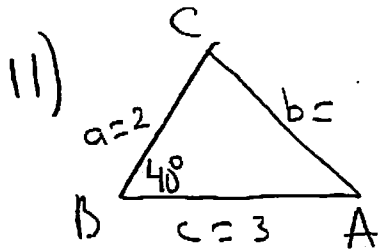
$$\underline{-1 \leq \sin \theta \leq 1} !$$



$$c = \overline{AB} = 1937.62$$

$$\frac{\sin 15^\circ}{c} = \frac{\sin 10^\circ}{1300}$$

$$c = \frac{1300 \sin 15^\circ}{\sin 10^\circ} = 1937.62$$



$$A = 41.2^\circ \quad a = 2$$

$$B = 40^\circ \quad b = 1.951$$

$$C = 98.8^\circ \quad c = 3$$

SAS

$$A = 180^\circ - 40^\circ - 98.8^\circ = 41.2^\circ$$

$$b^2 = a^2 + c^2 - 2ac \cos B$$

$$b^2 = 2^2 + 3^2 - 2(2)(3) \cos 40^\circ$$

$$b^2 = 4 + 9 - 12 \cos 40^\circ$$

$$b^2 = 3.807$$

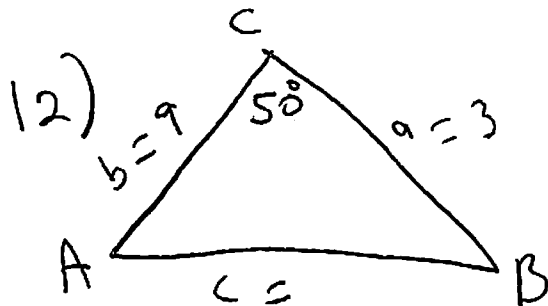
$$b = 1.951$$

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

$$\cos C = \frac{2^2 + 1.951^2 - 3^2}{2(2)(1.951)}$$

$$C = \cos^{-1} \left( \frac{2^2 + 1.951^2 - 3^2}{2(2)(1.951)} \right)$$

$$C = 98.8$$



(SAS)

$$A = \boxed{18.1^\circ} \quad a = 3$$

$$B = \boxed{111.9^\circ} \quad b = 9$$

$$C = 50^\circ \quad c = \boxed{7.44}$$

$$A = 180^\circ - 50^\circ - 111.9^\circ = 18.1^\circ$$

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

$$c^2 = 3^2 + 9^2 - 2(3)(9)(\cos 50^\circ)$$

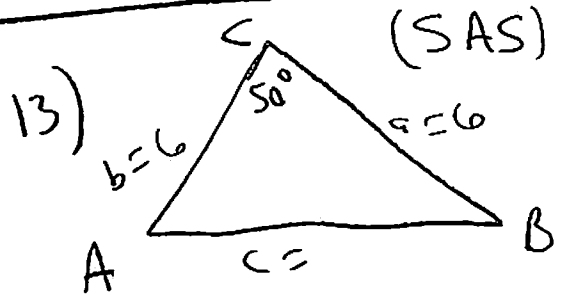
$$c^2 = 55.29$$

$$c = 7.44$$

$$\cos B = \frac{a^2 + c^2 - b^2}{2ac}$$

$$B = \cos^{-1} \left( \frac{3^2 + (7.44)^2 - 9^2}{2(3)(7.44)} \right)$$

$$B = 111.9^\circ$$



(SAS)

$$A = \boxed{65^\circ} \quad a = 6$$

$$B = \boxed{65^\circ} \quad b = 6$$

$$C = 50^\circ \quad c = \boxed{5.07}$$

$$A = 180^\circ - 50^\circ - 65^\circ = 65^\circ$$

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

$$c^2 = 6^2 + 6^2 - 2(6)(6) \cos 50^\circ$$

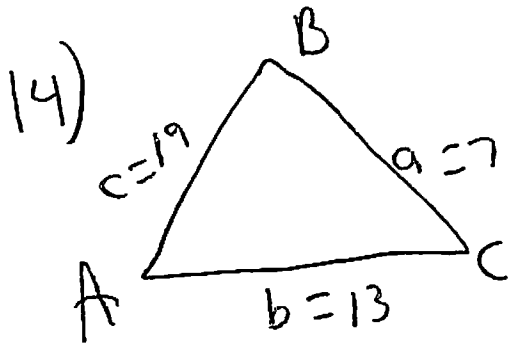
$$c^2 = 25.71$$

$$c = \boxed{5.07}$$

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

$$B = \cos^{-1} \left( \frac{6^2 + (5.07)^2 - 6^2}{2(6)(5.07)} \right)$$

$$B = \boxed{65^\circ}$$



(SSS)

$$A = 13.17^\circ \quad a = 7$$

$$B = 25.04^\circ \quad b = 13$$

$$C = 141.79^\circ \quad c = 19$$

$$C = 180^\circ - 13.17^\circ - 25.04^\circ = 141.79^\circ$$

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

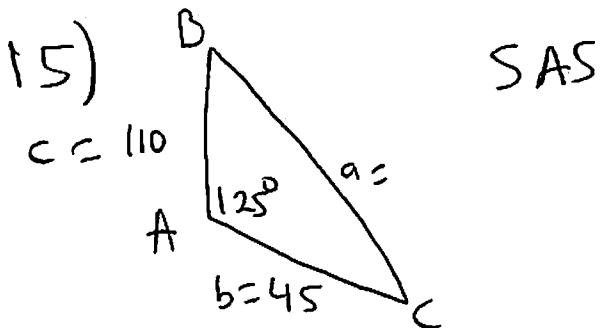
$$A = \cos^{-1} \left( \frac{13^2 + 19^2 - 7^2}{2(13)(19)} \right)$$

$$A = 13.17^\circ$$

$$\cos B = \frac{a^2 + c^2 - b^2}{2ac}$$

$$B = \cos^{-1} \left( \frac{7^2 + 19^2 - 13^2}{2(7)(19)} \right)$$

$$B = 25.04^\circ$$

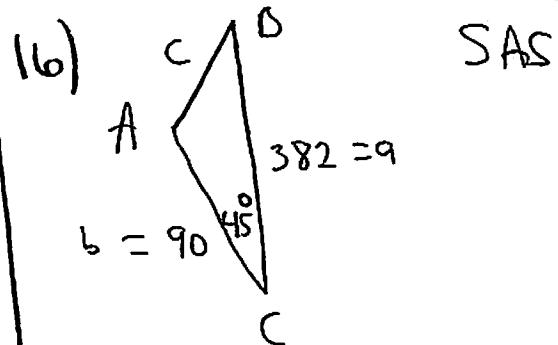


SAS

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

$$a^2 = 45^2 + 110^2 - 2(45)(110) \cos 125^\circ$$

$$a = 140.72$$



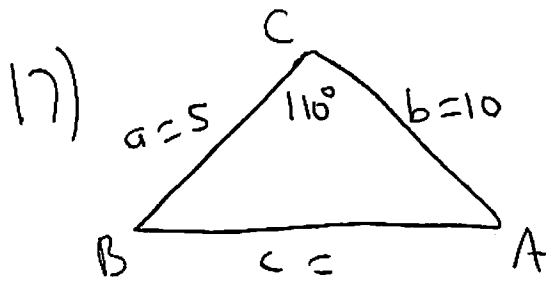
SAS

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

$$c^2 = 382^2 + 90^2 - 2(382)(90) \cos 45^\circ$$

$$c^2 = 105403.3377$$

$$c = 324.66$$



$$K = \frac{1}{2} ab \sin C = \frac{1}{2} (5)(10) \sin 110^\circ$$

$$K = \boxed{23.49}$$

18)

$$K = \frac{1}{2} bc \sin A = \frac{1}{2} (2)(10) \sin 70^\circ = \boxed{9.4}$$

19)

$$a = 8$$

$$b = 10$$

$$c = 6$$

$$A = \sqrt{s(s-a)(s-b)(s-c)}$$

$$s = \frac{a+b+c}{2} = \frac{8+10+6}{2} = \frac{24}{2} = 12$$

$$A = \sqrt{12(12-8)(12-10)(12-6)}$$

$$A = \sqrt{12(4)(2)(6)}$$

$$A = \sqrt{576} = \boxed{24}$$

20)

$$a = 188$$

$$b = 86$$

$$c = 177$$

$$s = \frac{a+b+c}{2} = \frac{188+86+177}{2} = 225.5$$

$$A = \sqrt{s(s-a)(s-b)(s-c)}$$

$$A = \sqrt{57212873.44} = 7563.9$$

$$\cos 6 = (3)(7563.9) = \boxed{22691.76}$$