

Unit 6 HW Pg 26

$$\textcircled{1} a^2 = b^2 + c^2 - 2bc \cos A$$

$$A = \cos^{-1} \left(\frac{a^2 - b^2 - c^2}{-2bc} \right)$$

$$A = \cos^{-1} \left(\frac{19.2^2 - 17.6^2 - 18.1^2}{-2(17.6)(18.1)} \right)$$

$$A = 50.4$$

$$B = \cos^{-1} \left(\frac{b^2 - a^2 - c^2}{-2ac} \right)$$

$$B = 63.1^\circ$$

$$C = 66.5^\circ$$

$$\textcircled{3} A = 84^\circ$$

$$\frac{\sin 84}{33} = \frac{\sin 61}{c} = \frac{\sin 35}{b}$$

$$c = \frac{33 \sin 61}{\sin 84} \approx 29.0$$

$$b = \frac{33 \sin 35}{\sin 84} \approx 19.0$$

$$\textcircled{5} A = 30^\circ$$

$$\frac{\sin 30}{5.4} = \frac{\sin 16}{c}$$

$$c = \frac{5.4 \sin 16}{\sin 30} \approx 3.0$$

$$\text{Area} = \frac{1}{2} ac \sin B$$

$$= \frac{1}{2} (5.4)(3.0) \sin 134$$

$$\approx 5.8 \text{yd}^2$$

$$\textcircled{2} c^2 = 21^2 + 14^2 - 2(14)(21) \cos 125$$

$$c = 31.2$$

$$A = \cos^{-1} \left(\frac{14^2 - 21^2 - 31.2^2}{-2(21)(31.2)} \right)$$

$$A = 53.4^\circ$$

$$B = 1.6^\circ$$

$$\textcircled{4} C = 20^\circ$$

$$\frac{\sin 63}{26} = \frac{\sin 97}{b} = \frac{\sin 20}{c}$$

$$b = \frac{26 \sin 97}{\sin 63} \approx 29.0$$

$$c = \frac{26 \sin 20}{\sin 63} \approx 10.0$$

$$\textcircled{6} B = 36^\circ$$

$$\frac{\sin 101}{4} = \frac{\sin 36}{b}$$

$$b = \frac{4 \sin 36}{\sin 101} \approx 2.4$$

$$\text{Area} = \frac{1}{2} bc \sin A$$

$$= \frac{1}{2} (2.4)(4) \sin 43$$

$$\approx 3.3 \text{m}^2$$

$$\textcircled{7} \text{Area} = \frac{1}{2} bc \sin A$$

$$= \frac{1}{2} (9.3)(7) \sin 99$$

$$= \boxed{32.1 \text{km}^2}$$

$$\textcircled{8} A = \cos^{-1} \left(\frac{a^2 - b^2 - c^2}{2bc} \right)$$

$$A = \cos^{-1} \left(\frac{9^2 - 10.4^2 - 4^2}{-2(10.4)(4)} \right)$$

$$A = 58.8^\circ$$

$$\text{Area} = \frac{1}{2} bc \sin A$$

$$= \frac{1}{2} (10.4)(4) \sin 58.8$$

$$\approx \boxed{17.8 \text{km}^2}$$

$$\textcircled{9} \quad S = \frac{5+4+6.5}{2} = 7.75$$

$$\text{Area} = \sqrt{7.75(7.75-4)(7.75-5)(7.75-6.5)}$$

$$\approx 10.0 \text{ yd}^2$$

$$\textcircled{10} \quad S = \frac{16+14+11}{2} = 20.5$$

$$\text{Area} = \sqrt{20.5(20.5-16)(20.5-14)(20.5-11)}$$

$$\approx 75.5 \text{ ft}^2$$

Unit 6 HW Pg. 27

① $\cot \theta \cdot \sec \theta$
 $\frac{\cos}{\sin} \cdot \frac{1}{\cos}$
 $\frac{1}{\sin}$
 $\csc \theta$
B

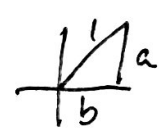
② $\frac{\sec \theta}{\csc \theta}$
 $\frac{1}{\cos \theta}$
 $\frac{1}{\sin \theta}$
 $\frac{\sin \theta}{\cos \theta}$
C

③ $\frac{1 - \cos^2 x}{\sin^2 x}$
 $\frac{\sin^2 x}{\sin^2 x}$
 1
A

④ $\frac{(1 + \cos x)(1 - \cos x)}{1 - \cos^2 x}$
 $\frac{1 - \cos^2 x}{1 - \cos^2 x}$
B

⑤ $\cos^2(4\theta) + \sin^2(4\theta)$
A

⑥ $\sin A + \cot^2 A \sin A$
 $\sin A (1 + \cot^2 A)$
 $\sin A (\csc^2 A)$
 $\sin A \cdot \frac{1}{\sin^2 A}$
 $\frac{1}{\sin A}$
 $\csc A$
D

⑦ $\sin \theta = a$

 $\sqrt{b^2} = \sqrt{1 - a^2}$
 $b = \sqrt{1 - a^2}$
C

⑧ $\frac{\sin^2 \beta \cot \beta}{\cos \beta}$
 $\frac{\sin \sin \cdot \frac{\cos}{\sin}}{\cos}$
sin β

⑨ $\sin x - \sin x \cos^2 x$
 $\sin x (1 - \cos^2 x)$
 $\sin x \sin^2 x$
sin³ x

⑩ $\sin^2 x + \cos\left(\frac{\pi}{2} - x\right) - 1 + \cos^2 x$
 $1 - 1 + \sin x$
sin x

Unit 6 HW pg 28

(11) $2\cos^2 x - 5\cos x + 3$

$(2\cos x - 3)(\cos x - 1)$

~~$\cos x = \frac{3}{2}$~~ $\cos x = 1$

$x = 0$

(12) $\cos^2 x + 4\sin x + 4 = 0$

$1 - \sin^2 x + 4\sin x + 4 = 0$

$-\sin^2 x + 4\sin x + 5 = 0$

$\sin^2 x - 4\sin x - 5 = 0$

$(\sin x - 5)(\sin x + 1) = 0$

~~$\sin x = 5$~~

$\sin x = -1$

$x = \frac{3\pi}{2}$

(13) $4\cos^2 x - 3 = 0$

$\sqrt{\cos^2 x} = \sqrt{\frac{3}{4}}$

$\cos x = \pm \frac{\sqrt{3}}{2}$

$x = \frac{\pi}{6}, \frac{5\pi}{6}, \frac{7\pi}{6}, \frac{11\pi}{6}$

(14) $2\tan x \sin x + \tan x = 0$

$\tan x (2\sin x + 1) = 0$

$\tan x = 0$ $\sin x = -\frac{1}{2}$

$x = 0, \pi, \frac{7\pi}{6}, \frac{11\pi}{6}$

(15) $\frac{\cos^2 \theta}{\sin^2 \theta} + \csc \theta \sin \theta = \csc^2 \theta$

$\cot^2 \theta + \frac{1}{\sin \theta} \cdot \sin \theta = \csc^2 \theta$

$\cot^2 \theta + 1 = \csc^2 \theta$

$\csc^2 \theta = \csc^2 \theta$

(16)

$\frac{1}{1 - \sin x} + \frac{1 + \sin x}{1 + \sin x} = 2 \sec^2 x$

$\frac{1 + \sin x + 1 - \sin x}{1 - \sin^2 x} = "$

$\frac{2}{\cos^2 x} = "$

$2 \sec^2 x = 2 \sec^2 x$

(17) $\frac{1 + \cos(2\alpha)}{\sin(2\alpha)} = \cot(\alpha)$

$\frac{1 + 2\cos^2 \alpha - 1}{2\sin \alpha \cos \alpha} = "$

$\frac{2\cos^2 \alpha}{2\sin \alpha \cos \alpha} = "$

$\frac{\cos \alpha}{\sin \alpha} = "$

$\cot \alpha = \cot \alpha$

Unit 6 HW Pg. 29



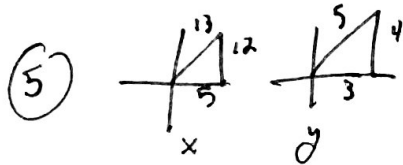
$$\cos(x+180)$$

$$\cos x \cos 180 - \sin x \sin 180$$

$$\frac{3}{5}(-1)$$

$$-\frac{3}{5}$$

D



$$\cos(x-y)$$

$$\cos x \cos y + \sin x \sin y$$

$$\frac{5}{13} \cdot \frac{3}{5} + \frac{12}{13} \cdot \frac{4}{5}$$

$$\frac{15 + 48}{65}$$

$$\frac{63}{65}$$

C

(8) $\sin 10 \cos 20 + \cos 10 \sin 20$

$$\sin 30$$

$$\frac{1}{2}$$

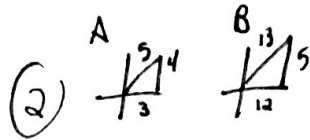
(9) $\cos^2 x \cos(\frac{3\pi}{2} - x) + \sin^2 x \cos(\frac{3\pi}{2} - x) = -\sin x$

$$\cos^2 x \left[\cos \frac{3\pi}{2} \cos x + \sin \frac{3\pi}{2} \sin x \right] + \sin^2 x \left[\cos \frac{3\pi}{2} \cos x + \sin \frac{3\pi}{2} \sin x \right] = -\sin x$$

$$2 \cos^2 x (-\sin x) + \sin^2 x (-\sin x) = -\sin x$$

$$(-\sin x)(\cos^2 x + \sin^2 x) = -\sin x$$

$$-\sin x = -\sin x$$



$$\sin(A+B)$$

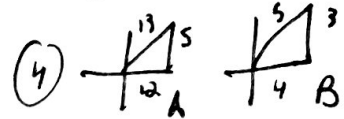
$$\sin A \cos B + \cos A \sin B$$

$$\frac{4}{5} \cdot \frac{12}{13} + \frac{3}{5} \cdot \frac{5}{13}$$

$$\frac{48 + 15}{65}$$

$$\frac{63}{65}$$

A



$$\sin(A+B)$$

$$\sin A \cos B + \cos A \sin B$$

$$\frac{5}{13} \cdot \frac{4}{5} + \frac{12}{13} \cdot \frac{3}{5}$$

$$\frac{20 + 36}{65}$$

$$\frac{56}{65}$$

A

(6) $\sin 105$
 $\sin(60+45)$
 $\sin 60 \cos 45 + \cos 60 \sin 45$

$$\frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} + \frac{1}{2} \cdot \frac{\sqrt{2}}{2}$$

$$\frac{\sqrt{6} + \sqrt{2}}{4}$$

(7) $\tan(-15)$
 $\tan(30-45)$

$$\frac{\tan 30 - \tan 45}{1 + \tan 30 \tan 45}$$

$$\frac{\frac{1}{\sqrt{3}} - 1}{1 + \frac{1}{\sqrt{3}} \cdot 1}$$

$$\frac{1 - \sqrt{3}}{\sqrt{3}} \cdot \frac{\sqrt{3}}{\sqrt{3} + 1}$$

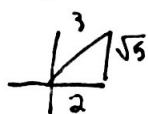
$$\frac{1 - \sqrt{3}}{1 + \sqrt{3}}$$

(10) $\sin(\frac{3\pi}{2} - x) = -\cos x$

$$\sin \frac{3\pi}{2} \cos x - \cos \frac{3\pi}{2} \sin x = -\cos x$$

$$-1 \cos x = -\cos x$$

Unit 6 HW pg 30

(1) 

$$\begin{aligned} \cos 2\theta &= 1 - 2\sin^2 \theta \\ &= 1 - 2\left(\frac{4}{5}\right)^2 \\ &= 1 - \frac{16}{5} \\ &= -\frac{11}{5} \end{aligned}$$

C

(2) $\sin x = \frac{12}{13}$

$$\begin{aligned} \cos 2x &= 1 - 2\sin^2 x \\ &= 1 - 2\left(\frac{12}{13}\right)^2 \\ &= \frac{169 - 288}{169} \\ &= -\frac{119}{169} \end{aligned}$$

D

(3) $\cos x = \frac{4}{5}$


$$\begin{aligned} \cos 2x &= 2\cos^2 x - 1 \\ &= 2\left(\frac{4}{5}\right)^2 - 1 \\ &= \frac{7}{5} \end{aligned}$$

D

(4) $\sin \theta = \frac{5}{13}$

$$\begin{aligned} \sin 2\theta &= 2\sin \theta \cos \theta \\ &= 2\left(\frac{5}{13}\right)\left(\frac{12}{13}\right) \\ &= \frac{120}{169} \end{aligned}$$

D

(5) 
 $\sin x = \frac{1}{2}$

$$\begin{aligned} \sin 2x &= 2\sin x \cos x \\ &= 2\left(\frac{1}{2}\right)\left(\frac{\sqrt{3}}{2}\right) \\ &= \frac{\sqrt{3}}{2} \end{aligned}$$

A

(6) $\sin 2\theta = \frac{\sqrt{3}}{2}$
 $\sin \theta = \frac{1}{2}, \cos \theta = \frac{\sqrt{3}}{2}$

$$\begin{aligned} \left(\frac{1}{2} + \frac{\sqrt{3}}{2}\right)^2 &= \frac{1}{4} + 2\frac{\sqrt{3}}{4} + \frac{3}{4} \\ &= 1 + \frac{\sqrt{3}}{2} \end{aligned}$$

C

(7) $\frac{\sin 2A}{2\cos A}$
 $\frac{2\sin A \cos A}{2\cos A}$
 $\sin A$

B

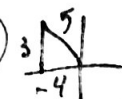
(8) $\frac{\sin 2\theta}{\sin^2 \theta}$
 $\frac{2\sin \theta \cos \theta}{\sin^2 \theta}$
 $2\cot \theta$

B

(9) $\frac{2\cos \theta}{\sin 2\theta}$
 $\frac{2\cos \theta}{2\sin \theta \cos \theta}$
 $\csc \theta$

A

(10) ~~X~~

(11) 

(a) $\sin 2\theta = 2\left(\frac{3}{5}\right)\left(-\frac{4}{5}\right) = -\frac{24}{25}$

(b) $\cos 2\theta = 1 - 2\sin^2 \theta = 1 - 2\left(\frac{3}{5}\right)^2 = \frac{25}{25} - \frac{18}{25} = \frac{7}{25}$

(c) $\tan 2\theta = \frac{2\tan \theta}{1 - \tan^2 \theta} = \frac{2\left(-\frac{4}{3}\right)}{1 - \left(-\frac{4}{3}\right)^2} = \frac{-\frac{8}{3}}{\frac{16}{9}} = -\frac{3}{2} \cdot \frac{16}{7} = -\frac{48}{7}$

(12) $1 - 2\sin^2\left(\frac{\pi}{8}\right)$
 $\cos 2\left(\frac{\pi}{8}\right)$
 $\cos \frac{\pi}{4}$
 $\frac{\sqrt{2}}{2}$

A

(13) $\frac{2\tan 75}{1 - \tan^2 75}$
 $\tan 2(75)$
 $\tan 150$
 $-\frac{1}{\sqrt{3}}$

A