

(5) ① Convert $38^\circ 27' 42''$ to decimal degrees, (four decimal places) Show work.

(10) ② a) Convert 200° to radians.

b) Find the central angle, in degrees, when the radius is 3 inches and the intercepted arc is 7 inches

(10) ③ a) Simplify without a calculator. Show steps.

$$\sin 25^\circ \cos 65^\circ + \cos 25^\circ \sin 65^\circ$$

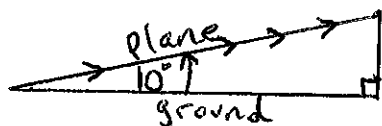
b) Use an identity to find the exact value of $\tan^2 \theta$ if $\sec \theta = \frac{3}{2}$

(10) ④ a) Find $\sec(3.24)$

b) Find the exact value of $2 \cos 45^\circ + 3 \sin 60^\circ$

(5) ⑤ If $A = 32^\circ$, $a = 4$, solve right triangle ABC ($C = 90^\circ$)

(5) ⑥ If a jetliner climbs at a constant angle of 10° for 15 miles find how much altitude it has gained.



(not to scale)

(10) ⑦ If $\sec \theta = \frac{11}{4}$ and θ is in QIV, find the exact values of each of the other 5 trig. functions.

(5) ⑧ Find the exact value (radical form) of $\sec\left(\frac{5\pi}{4}\right)$

(5) ⑨ Solve $\sin x = -1$ on $-3\pi \leq x \leq 3\pi$

(10) ⑩ Sketch

a) $y = \csc \theta$ b) $y = \tan \theta$

(5) ⑪ Sketch

$$y = 2 \sec(x - 45^\circ)$$

(10) ⑫ Sketch

$$y = -3 \sin\left(\frac{1}{2}x + 30^\circ\right)$$

(10) ⑬ a) Find

3 pts. $\cos\left(\tan^{-1}\left(-\frac{5}{2}\right)\right)$ exactly.

b) Write $\sec(\sin^{-1} x)$ as 4 pts. an algebraic expression (without trig. or inverse trig. functions.)

c) Find the exact value 3 pts. of $\cos^{-1}\left(\cos\left(\frac{5\pi}{4}\right)\right)$ Show work.

Note: "exact" or "exactly" means to leave radical form, multiples of π , etc. (i.e. not on the calculator)

MAC 1114 EXAM I KEY (SP'11)

① $38 + \frac{27}{80} + \frac{42}{3600} = 38.4617^\circ$

② a) $200^\circ \left(\frac{\pi}{180^\circ} \right) = \frac{10\pi}{9}$ or 3.491

b) $s = r\theta$ $r = 3\theta \Rightarrow \frac{7}{3} = \theta$

$\frac{7}{3} \left(\frac{180^\circ}{\pi} \right) = 133.7^\circ$

③ a) $\sin 25^\circ \sin 25^\circ + \cos 25^\circ \cos 25^\circ$
 $= \sin^2 25^\circ + \cos^2 25^\circ = 1$

b) $\sec^2 \theta = \tan^2 \theta + 1$

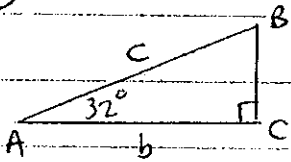
$\left(\frac{3}{2}\right)^2 = \tan^2 \theta + 1$

$\frac{5}{4} = \tan^2 \theta$

④ a) -1.00486

b) $2\left(\frac{\sqrt{2}}{2}\right) + 3\left(\frac{\sqrt{3}}{2}\right) = \sqrt{2} + \frac{3\sqrt{3}}{2}$

⑤ $\sin 32^\circ = \frac{4}{c}$



not to scale

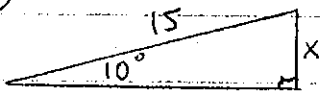
$c = \frac{4}{\sin 32^\circ}$

≈ 7.55

$B = 90^\circ - 32^\circ = 58^\circ$

$\tan 32^\circ = \frac{4}{b} \Rightarrow b \approx 6.401$

⑥ $\sin 10^\circ = \frac{x}{15}$



$x \approx 2.6$ miles

⑦ $\tan \theta = -\frac{\sqrt{105}}{4}$ $\cot \theta = -\frac{4}{\sqrt{105}}$

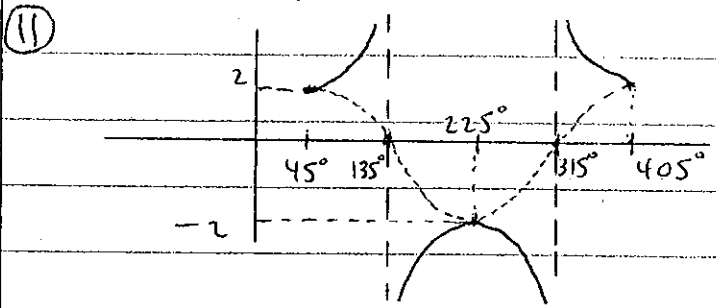
$\sin \theta = -\frac{\sqrt{105}}{11}$ $\csc \theta = -\frac{11}{\sqrt{105}}$

$\cos \theta = \frac{4}{11}$

⑧ $-\frac{2}{\sqrt{2}}$ or $-\sqrt{2}$

⑨ $-\frac{5\pi}{2}, -\frac{\pi}{2}, \frac{3\pi}{2}$

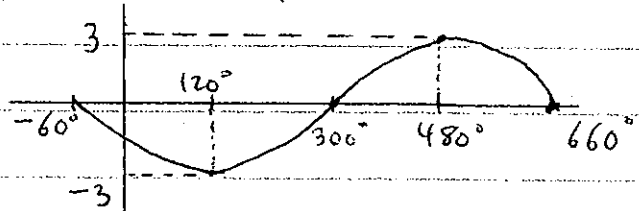
⑩ see notes, text



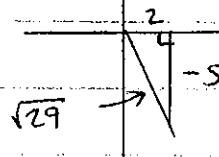
⑫ $y = -3 \sin\left[\frac{1}{2}(x + 60^\circ)\right]$

period = $\frac{360^\circ}{(\frac{1}{2})} = 720^\circ$

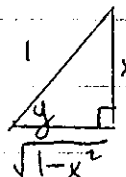
steps = $\frac{720^\circ}{4} = 180^\circ$



⑬ a) $\frac{2}{\sqrt{29}}$



b) $\frac{1}{\sqrt{1-x^2}}$



c) $\cos^{-1}\left(-\frac{\sqrt{2}}{2}\right) = \frac{3\pi}{4}$