MAC 1114 EXAM I MR. NADEL FALL 2011

(5) ① Convert 29.4581° to degrees, minutes, seconds. Show all work.

(10) ② a) Convert 4.2 radians to degrees.

b) Find the length of the intercepted arc if the radius of a circle is 4 inches, and the central angle is 35°.

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

$$1 - \cos^2 25^\circ - \cos^2 65^\circ$$

b) Use an identity to find the exact value of $\cot\left(\frac{\pi}{2} - \theta\right)$ if $\tan\theta = 5$.

(10) ④ a) Find $\cot(2.77)$ on the calculator.

b) Find the exact value of $3\sin 45^\circ - 2\cos 30^\circ$

(5) ⑤ If $a=4$, $c=7$, find b and B in right triangle ABC ($C = 90^\circ$)

(5) ⑥ If a plane climbs at a constant angle of 8° to the horizontal and reaches a height of 10 miles, how far has the plane gone? (in the air)

(10) ⑦ If $\cos\theta = \frac{2}{5}$, θ in QIV, find the exact values of each of the other 5 trig. functions.

(5) ⑧ Find the exact value (radical form) of

$$\tan\left(\frac{2\pi}{3}\right)$$

(5) ⑨ Find where $\tan x$ is undefined on

$$-2\pi \le x \le 2\pi$$

(10) ⑩ Sketch

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

(5) ⑪ Sketch

$$y = 2\tan(3x)$$

(10) ⑫ Sketch

$$y = -3\cos(2x + 90^\circ)$$

(10) ⑬ a) Find (3 pts.) $\tan\left(\sin^{-1}\left(-\frac{4}{9}\right)\right)$ exactly

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

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

MAC 1114 EXAM I KEY (F'11)

① $(.4581)(60) = 27.486'$

$(.486)(60) = 29$

Get $29° 27' 29''$.

② a) $(4.2)\left(\frac{180°}{\pi}\right) \approx 240.64°$

b) $s = r\theta = 4(35°)\left(\frac{\pi}{180°}\right) = 2.44$

③ a) $1 - \cos^2 25° - \cos^2 65°$

$= 1 - \cos^2 25° - \sin^2 25°$

$= 1 - (\cos^2 25° + \sin^2 25°)$

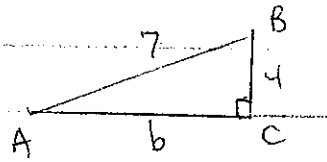
$= 1 - 1 = 0$

b) $\cot\left(\frac{\pi}{2} - \theta\right) = \tan\theta = 5$

④ a) -2.566

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

⑤



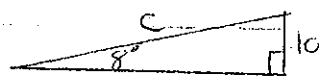
$16 + b^2 = 49$

$b = \sqrt{33}$

$\cos B = \frac{4}{7}$

$\Rightarrow B = 55.2°$

⑥



(not to scale)

$\sin 8° = \frac{10}{c}$

$c \approx 71.9$ miles

⑦ $\cot\theta = -\frac{2}{\sqrt{21}}$ $\csc\theta = -\frac{5}{\sqrt{21}}$

$\sin\theta = -\frac{\sqrt{21}}{5}$ $\tan\theta = -\frac{\sqrt{21}}{2}$

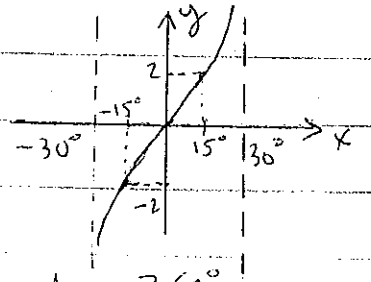
$\sec\theta = \frac{5}{2}$

⑧ $-\sqrt{3}$

⑨ $\pm\frac{3\pi}{2}, \pm\frac{\pi}{2}$

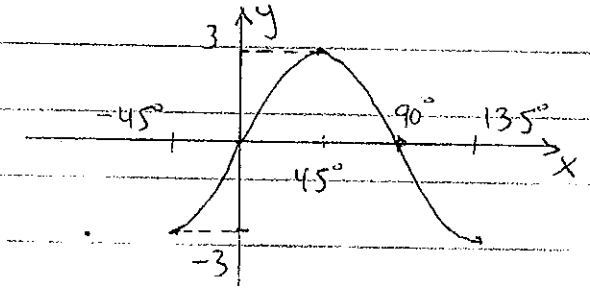
⑩ See notes

⑪

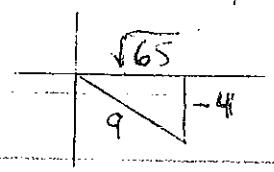


⑫ period $= \frac{360°}{2} = 180°$

steps $= \frac{180°}{4} = 45°$

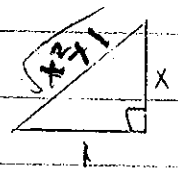


⑬ a)



$-\frac{4}{\sqrt{65}}$

b)



$\frac{1}{\sqrt{x^2+1}}$

c) $-\frac{\pi}{4}$