

(10) (1) a) Sketch  $y = \sec \theta$ b) Sketch  $y = \tan \theta$ (5) (2) Sketch  $y = 3 \cot 2x$ 

Be sure to include the correct pts where the heights are 3 and -3.

(10) (3) Sketch

$$y = -2 \cos(3x - 180^\circ)$$

Draw one cycle

(10) (4) a) Find  $\cos(\tan^{-1}(-4))$ 3 pts.  $\uparrow$  exactly. Draw a picture of the angle in the correct quadrant.b) Write  $\sec(\tan^{-1}x)$  as 4 pts.  $\uparrow$  an algebraic expression (without trig or inverse trig. functions)c) Find the exact value of  $\cos^{-1}(\cos \frac{7\pi}{6})$ .

Show work.

(10) (5) Prove:

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

(15) (6) a) Simplify completely:

$$\sin(x + \pi)$$

b) Find the exact value of  $\cos 105^\circ$ .

Use a sum formula.

Do not use a half angle formula.

c) Use an appropriate identity to find the exact value of

$$\frac{\tan 25^\circ + \tan 35^\circ}{1 - \tan 25^\circ \tan 35^\circ}$$

(10) (7) Derive a formula for  $\tan(x-y)$  in terms of  $\tan x$  and  $\tan y$ .

(Don't just state it. Prove it.)

# MAC 1114 EXAM II KEY (MWF, F'11)

① a), b) See text, notes

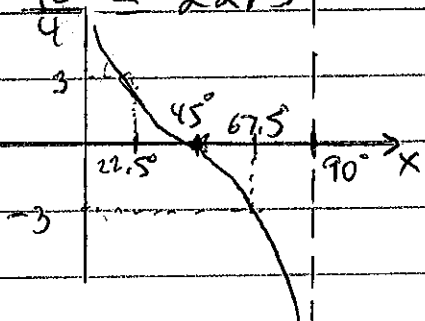
② asymptotes:

$$2x = 0 \Rightarrow x = 0$$

$$2x = 180^\circ \Rightarrow x = 90^\circ$$

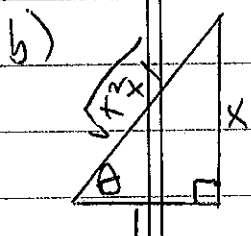
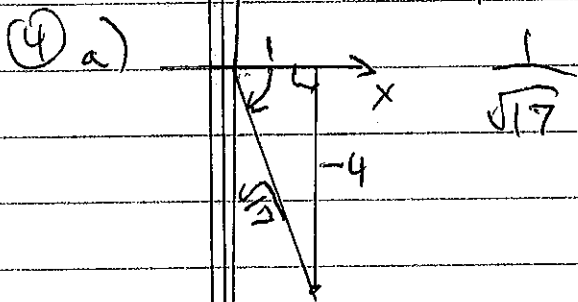
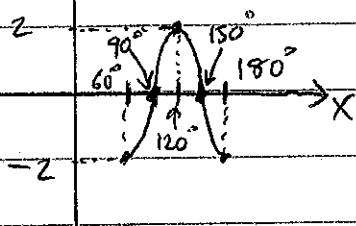
$$\text{period} = \frac{180^\circ}{2} = 90^\circ$$

$$\text{steps} = \frac{90^\circ}{4} = 22.5^\circ$$



③ period =  $\frac{360^\circ}{3} = 120^\circ$

$$\text{steps} = \frac{120^\circ}{4} = 30^\circ$$



$$\sec(\tan^{-1} x) = \frac{\sqrt{x^2 + 1}}{1} = \sqrt{x^2 + 1}$$

④ c)  $\cos^{-1}\left(-\frac{\sqrt{3}}{2}\right) = \frac{5\pi}{6}$

⑤  $\frac{1}{1 - \sin x} + \frac{1}{1 + \sin x} =$

$$\frac{1 + \sin x + 1 - \sin x}{(1 - \sin x)(1 + \sin x)}$$

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

⑥ a)  $\sin x \cos \pi + \cos x \sin \pi = \sin x(-1) + \cos x(0) = -\sin x$

b)  $\cos(60^\circ + 45^\circ) = \cos 60^\circ \cos 45^\circ - \sin 60^\circ \sin 45^\circ = \frac{1}{2} \cdot \frac{\sqrt{2}}{2} - \frac{\sqrt{3}}{2} \cdot \frac{\sqrt{2}}{2} = \frac{\sqrt{2} - \sqrt{6}}{4}$

c)  $\tan(25^\circ + 35^\circ) = \tan 60^\circ = \sqrt{3}$

⑦ see text, notes