## MATH 1330 Review for Test -4

Monday, May 2 Friday, April 29 Time: 50 minutes

Number of questions: 11 Multiple Choice Questions (total: 100 pts)

What is covered: 5.1, 4.4, Chapters 6 and 7.

Do not forget to reserve a seat for Test - 4!

Take practice Test – 4! 10% of your best score will be added to your test grade.

Remember the make-up policy: No make-ups!

The following formulas will be provided. It is your responsibility to locate the formula sheet before you start your test. If you can't find it, ask proctors for help.

## Handy Formulas $\longrightarrow$ Only these formulas will be provided to You. $\sin (s + t) = \sin s \cos t + \cos s \sin t$ $\sin (s - t) = \sin s \cos t - \cos s \sin t$ $\cos (s + t) = \cos s \cos t - \sin s \sin t$ $\cos (s - t) = \cos s \cos t + \sin s \sin t$ $\tan (s + t) = \frac{\tan s + \tan t}{1 - \tan s \tan t}$

$$\tan(s-t) = \frac{\tan s - \tan t}{1 + \tan s \tan t}$$

sin(2t) = 2sin t cos t

$$\cos(2t) = \cos^2 t - \sin^2 t$$

$$\sin\frac{s}{2} = \pm \sqrt{\frac{1-\cos s}{2}} \qquad \qquad \cos\frac{s}{2} = \pm \sqrt{\frac{1+\cos s}{2}} \qquad \qquad \tan\frac{s}{2} = \frac{\sin s}{1+\cos s}$$

1) Simplify: 
$$-\frac{\cos(-x)}{\cot(-x)} - \frac{\cos x}{-\cot x} = \frac{\cos x}{\frac{\cos x}{\sin x}} = \frac{\cos x}{1 - \cos x} = \frac{\sin x}{\cos x}$$

Question #1  
2) Simplify: 
$$3\cos^2(x) + \frac{2 - \cot^2(x)}{1 + \cot^2(x)} = 3 \cos^2 x + \frac{2 - \sin^2 x}{1 + \cot^2(x)} = \frac{2 - \sin^2 x}{1 + \cot^2 x} + \frac{2 - \cos^2 x}{1 + \cot^2 x} + \frac{2 - \cot^2 x}{1 + \cot^$$

$$= 3\cos^{2} x + \left(\frac{2\sin^{2} x - \cos^{2} x}{\sin^{2} x}\right) \cdot \frac{\sin^{2} x}{1} = 3\cos^{2} x + 2\sin^{2} x - \cos^{2} x = 2\cos^{2} x + 2\sin^{2} x$$
$$= 2\left(\cos^{2} x + \sin^{2} x\right) = 2$$
$$= 1$$

Question #2  
3) Simplify: 
$$\tan(x) - \frac{\cos(x)}{1 - \sin(x)} = \frac{\sin x}{\cos x} \cdot \frac{(1 - \sin x)}{\cos x} = \frac{\cos x}{(1 - \sin x)} = \frac{-1}{\cos x} \cdot \frac{\cos x}{\cos x}$$
  

$$= \frac{\sin x - \sin^{2} x - \cos^{2} x}{\cos x (1 - \sin x)} = \frac{\sin x - (\sin^{2} x + \cos^{2} x)}{\cos x (1 - \sin x)} = \frac{-1}{\cos x} \cdot \frac{-1}{\cos x}$$

$$= -\frac{1}{\cos x} = \frac{-1}{\cos x} = \frac{-1}{\cos x} \cdot \frac{-1}{\cos x}$$
Another version:  $\frac{1}{1 - \cos(x)} + \frac{1}{1 + \cos(x)}$  correst despension of  $\frac{1}{\cos x} - \frac{2}{\sin^{2} x}$   

$$= \frac{(1 + \cos x)}{(1 - \cos x)(1 + \cos x)} = \frac{2}{1 - \cos^{2} x} = \frac{2}{\sin^{2} x}$$

$$= \frac{2 - \csc^{2} x}{2 - \cos^{2} x}$$

Question #3  
4) Given 
$$\sin(x) = \frac{1}{4}$$
,  $90^{\circ} < x < 180^{\circ}$ , and  $\sin(y) = -\frac{2}{5}$ ,  $180^{\circ} < y < 270^{\circ}$ , find:  
 $\sin(x) = \frac{1}{4}$ ,  $\sin(x) = \frac{1}{4}$ ,  $\sin(x) = -\frac{2}{5}$ ,  $\sin(y) = -\frac{1}{5}$ ,  $\sin(y) = -\frac{2}{5}$ ,  $\sin(y) = -\frac{1}{5}$ ,  $\sin(y) = -$ 

Question #4  
5) Given 
$$\tan(x) = -\frac{1}{5}$$
,  $90^0 < x < 180^0$ ,



 $= \cos^2 x - \sin^2 x$ 



a)  $\sin(2x) = 25$  in x C = 5x

=

b)  $\cos(2x)$ 

$$= 2 \cdot \frac{1}{\sqrt{26}} \cdot \frac{-5}{\sqrt{26}}$$

$$= \frac{-10}{26} = \frac{-5}{13}$$

$$= \left(\frac{-5}{\sqrt{26}}\right)^{2} - \left(\frac{1}{\sqrt{26}}\right)^{2}$$
$$= \frac{25}{26} - \frac{1}{26} = \frac{24}{26} = \left(\frac{12}{13}\right)^{2}$$

6) Given 
$$\sin(x) = \frac{3}{5}$$
, where x is an acute angle, find  $\sin\left(\frac{x}{2}\right)$ .  $= +\sqrt{\frac{1-\cos x}{2}} = \sqrt{\frac{1-\frac{4}{5}}{2}} = \sqrt{\frac{\frac{1}{5}}{2}}$   
 $= \sqrt{\frac{1}{10}} = \sqrt{\frac{10}{10}}$ 

7) Find the following using the sum or difference formulas:

a) 
$$\cos(75^{\circ}) = \cos(30^{\circ} + 45^{\circ}) = \cdots$$

b) 
$$\sin(105^{\circ}) = \sin\left(60^{\circ} + 45^{\circ}\right) = \cdots$$



Question #6 9) Solve the following equation on the interval  $[0,2\pi)$ :

Factor  

$$4\sin^{2}(x)+9\sin(x)+5=0$$

$$(4\sin x + 5)(\sin x + 1) = 0$$

$$4\sin x + 5 = 0 \text{ rsin } x + 1 = 0$$

$$4\sin x = -5 \quad \sin x = -1 = 2 \text{ rsin } x = \frac{3\pi}{2}$$

$$\sin x = -\frac{5}{4}$$

Question #7 12) The angle of elevation from a point that is 120 ft away from a building to the top of the building is  $25^{\circ}$ . Find the height of the building.



ton (25°) = 
$$\frac{x}{120}$$
 =>  $x = 120 \tan(25°)$   
Note: If the argle is 30,45,60°,  
make sure you evaluate!

Question #8  
10) Find the area of triangle ABC if 
$$\angle B = 30^{\circ}$$
,  $c = 10$  and  $a = 12$ .  
Check: S.A.S  
 $A = 12$   
 $A = 12$   



## Question #10 – Law of Cosine

13) Two boats leave the dock at the same time and they travel with an angle of  $150^{\circ}$  between them. What is the distance between them after they each travel 50 meters and 70 meters respectively?



$$d^{2} = 50^{2} + 70^{2} - 2 \cdot 50 \cdot 70 \cdot \cos(150^{\circ})$$
  

$$d^{2} = 2500 + 4400 - 7000 \cdot (-\sqrt{3})$$
  

$$d^{2} = 7400 + 3500 \sqrt{3}$$
  

$$d^{2} = 100 (74 + 35 \sqrt{3}) = d = \sqrt{100(74 + 35 \sqrt{3})}$$
  

$$d^{2} = 10 \sqrt{74 + 35 \sqrt{3}}$$

Question #11 – Law of Sines 14) Given a triangle ABC,  $A = 45^{\circ}$ ,  $B = 30^{\circ}$ , BC = 60 cm, find AC.



$$\frac{\sin(30^\circ)}{\mathbf{x}} = \frac{\sin(45^\circ)}{60}$$

$$\times \cdot \frac{\sin(45^\circ)}{5in(45^\circ)} = \frac{60 \times \sin(30^\circ)}{5in(45^\circ)}$$

=) 
$$X = \frac{60 \cdot \sin(30^{\circ})}{\sin(45^{\circ})} = \frac{60 \cdot \frac{1}{2}}{\frac{\sqrt{2}}{2}} = \frac{30 \cdot \frac{2}{2}}{\sqrt{2}}$$

$$X = \frac{60}{\sqrt{2}}, \frac{\sqrt{2}}{\sqrt{2}} = \frac{60\sqrt{2}}{2} = 30\sqrt{2}$$

$$\Rightarrow$$
  $X = 30\sqrt{2}$ 

extra examples







 $h \prec opp = BC = 5V3$ 

2 triangles => 2 choices