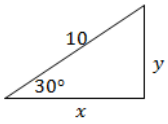
# Math 110 - Mandatory Hand-In Homework to be Collected and Graded

| Lect.# | Section #, Problems and Special Projects |
|---|---|
| 1 | Section P.1: 117,129,137<br>Section P.2: 41,79,85<br>Section P.6: 31,57,67,99,104<br>Section P.3: 23,49,65<br>Section P.4: 25,55,63,79,85,91,93 |
| 2 | Section P.5: 19,29,71,89<br>Section 1.1: 41,56,65,79<br>Section 1.2: 21,27,39,47,81,87<br>Section 1.4: 11,17,45,57,77 |
| 3 | Section 4.1: 24,26,37,56,61,65,69,74,85,86 |
| 4 | Section 4.2: 40,50,56,76,86,94,96,99,103 |
| 5 | Section 4.3: 15,17,32,44,70,72,85 |
| 6 | Section 4.4: 22,24,32,41,42,60,70 |
| 7 | Section 5.1: 30,34,56,58,62,72,76,77,82<br><br>**Application Problems**<br>1. A wheel with a 10" diameter rolls 6 ft to the left. Find the angle it turns through in degrees.<br><br>2.An automobile with wheels of radius 15 inches is pushed so that the wheels turn three-quarters of a revolution to the left. How far does the car move?<br><br>3.Find the area of a sector of a circle given a central angle of 110° and a radius of 3 cm. |
| 8 | **Application: Pulley System Project**<br>**Lecture/HW packet given in class: Prob. 1-7 odd** |
| 9 | Section 5.2: 10,14,26,32,40,44,50,84,85 |
| 10 | **Application Problems**<br>1. Suppose that $\sin\theta = \frac{K}{4}$ where 'K' is a nonzero constant. Find the values of the other 5 trigonometric functions in terms of 'K'.<br><br>2. Suppose $\sin(\theta) = \frac{a}{b}$ (where a and b are nonzero constants). Find the following in terms of 'a' and 'b':<br>a) $\csc(\theta)$ b) $\cos^2(\theta) - 1$ c) $\tan^2(\theta)$ d) $\sin(\theta + 4\pi)$<br><br>3. Find the exact values of x and y in the triangle below:<br>  |
| 11 | Section 5.3: 16,19,34,39,43,45,57 |
| 12 | Section 5.3: 65,77,88 |
| 13 | Section 5.4: 20,21,38,52,56,69,70,87,91<br><br>**Application Problems**<br>Sketch one period of the following function. Label the 5 key points.<br>$y = -2\cos\left(\frac{\pi}{2}x + \frac{\pi}{4}\right) + 1$ |

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| 14 | Section 5.5: 10,30,35,37 |
| 15 | Section 5.6: 12,20,22,30,34,36,48<br><br>**Application Problems**<br>1. Evaluate $\sin\left[\cos^{-1}\left(\frac{1}{x}\right)\right]$ in terms of x. (Hint: draw a right triangle and label the sides accordingly)<br><br>2. Find the exact value of the inverse trig. expression, or state that it is undefined.<br>$\tan\left[\cos^{-1}\left(\frac{1}{2}\right)+\sin^{-1}\left(-\frac{1}{2}\right)\right]$ |
| 16 | **Application Problems**<br>Simplify the algebraic expression below by using the given trigonometric substitution. Assume that $0<\theta<\frac{\pi}{2}$.<br>a) $y=\frac{\sqrt{16-x^2}}{\sin x}$, $x=4\sin\theta$ b) $y=\frac{x}{\sqrt{x^2-25}}$, $x=5\sec\theta$ c) $y=\frac{x}{\sqrt{4+x^2}}$, $x=2\tan\theta$ |
| 17 | Section.6.1: 14,32,38,40,60,64,72,80,100<br><br>**Application Problems**<br>Simplify the algebraic expression below by using the given trigonometric substitution. Assume that $0<\theta<\frac{\pi}{2}$.<br>a) $y=\sqrt{1+x^2}$, $x=\tan\theta$ b) $y=\sqrt{x^2-1}$, $x=\sec\theta$ c) $y=\frac{x}{\sqrt{4+x^2}}$, $x=2\tan\theta$ |
| 18 | Section.6.2: 22,28,42,68<br><br>**Application Problems**<br>If $\cos(\alpha)=-\frac{2}{5}$, with α in Quad. II, and $\sin(\beta)=-\frac{3}{7}$, with β in Quad. IV, find:<br>a) $\sin(\alpha-\beta)$ b) $\cos(\alpha-\beta)$ c) $\tan(\alpha-\beta)$ d) angle $(\alpha-\beta)$ lies in what quadrant? |
| 19 | **Application : Rolling Wheel Project**<br>**Lecture/HW packet given in class. Probs. 1-7 odd** |
| 20 | Section 6.3: 16,25,26,33,35,41,44,48<br><br>**Application Problems**<br>1. Given $\sin\theta=-\frac{3}{5}$, θ in Quad. III, find:<br>a) $\sin(2\theta)$ b) $\cos(2\theta)$ c) $\tan(2\theta)$ d) angle $2\theta$ lies in what quadrant?<br><br>e) $\sin\left(\frac{\theta}{2}\right)$ f) $\cos\left(\frac{\theta}{2}\right)$ g) $\tan\left(\frac{\theta}{2}\right)$ h) angle $\frac{\theta}{2}$ lies in what quadrant?<br><br>2. Use the double angle identities to find a triple angle identity for $\cos 3x$ in terms of $\cos x$ only. |
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| 22 | Section 6.5: 14,40,48,62,68 |
| 23 | Section 6.6: 10,14,22,66,71 |
| 24 | Section 7.1:10,14,61,69<br><br>**Application Problems**<br>Find the exact value(s) indicated for the triangle ABC given the following:<br>a) $B=45°, C=30°, b=6$, find A and c b) $A=135°, a=4, b=2\sqrt{2}$, find B<br><br>c) $A=120°, C=30°, a=10$, find B and c d) $a=\sqrt{3}, c=\sqrt{6}, A=30°$, find C, B and b. |

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| 25 | Section 7.2: 10,12,18,38,42<br><br>**Application Problems**<br>Find the exact value(s) indicated for the triangle ABC given the following:<br>a) $C = 60°,\ a = 6,\ b = 8,$ find c.<br><br>b) $a = \sqrt{13},\ b = 2, c = \sqrt{3},$ find A.<br><br>c) $A = 45°,\ a = 12,\ c = 6\sqrt{2},$ find b. |
| 26 | Section 7.3: 6,8,36,44<br><br>**Application Problems**<br>Find the area of the triangle ABC given the following:<br>a) $A = 60°,\ b = 4,\ c = 7.$<br><br>b) $B = 135°,\ a = 2\sqrt{2},\ c = 6.$<br><br>c) $a = 8,\ b = 10,\ c = 6.$<br><br>d) $a = 12,\ b = 13,\ c = 5.$<br><br>e) In terms of 'k', find the area of a triangle with side lengths of $6,\ k-2$ and $k+2$. Then find the range of values of k for which such a triangle can exist. |
| 27 | **Application Problems**<br>a) Sketch the triangle OAB determined by the origin (pole) and the points whose polar coordinates are $A(2\sqrt{2}, 10°)$ and $B(8, 145°)$.<br><br>b) Determine the length of side AB using the Law of Cosines.<br><br>c) Use Heron's formula to find the area of the triangle OAB.<br><br>d) Check the result of part c) above geometrically by rotating the triangle so that side $OA$ coincides with the positive x-axis and using the formula of a right triangle:<br>$Area = \frac{1}{2}(base)(height)$. |
| 28 | Section 2.2: 72,76,78,80,82 |
| 29 | Section 10.3: 14,20,28,36,46,52 |
| 30 | Section 7.6:10,30,38,39,43,46,47,52 |
| 31 | Section 7.6: 64,66,68,70 |
| 32 | Section 8.1: 60,64,74,76<br><br>**Application Problems**<br>1. A line passing through the center of a circle intersects its diameter diagonally with the endpoints: $P(0,2)\ and\ Q(6,8)$.<br>a) Find the equation of this line in the $y = mx + b$ form.<br><br>b) Find the equation of the circle in Standard Form.<br><br>c) Graph the circle and the line on the same set of axes.<br><br>2. In terms of a, b and c, solve the following system of equations. Express x and y as single fractions.<br>$\begin{cases} x + by = 2 \\ ax - cy = 0 \end{cases}$ |

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| 33 | Section 8.2: 20,24<br><br>**Application Problem**<br><br>In terms of 'a', solve the following system of equations: $\begin{cases} x+y=3a \\ y+z=3a+2 \\ 2x-y+z=a+2 \end{cases}$ |
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| 35 | Section 8.3: 18,20,26,40 |
| 36 | Section 8.3: 60,70,71 |
| 37 | Section 8.4: 18,32,44,48,60,66,70<br><br>**Application Problems**<br>a) Find the intersection point(s) between the following curves using any method:<br>$\begin{cases} x^2+y^2=25 \\ x^2-y=5 \end{cases}$<br><br>b) Then graph the 2 curves on the same set of axes and confirm the point(s) of intersection. |
| 38 | Section 9.1: 10,14,30,32,56,66,72 |
| 39 | Section 9.2: 10,18,22,30,32 |
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Last revised: August 15, 2018

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