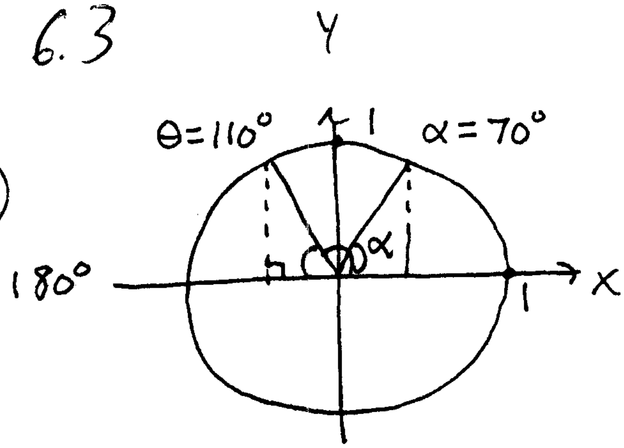
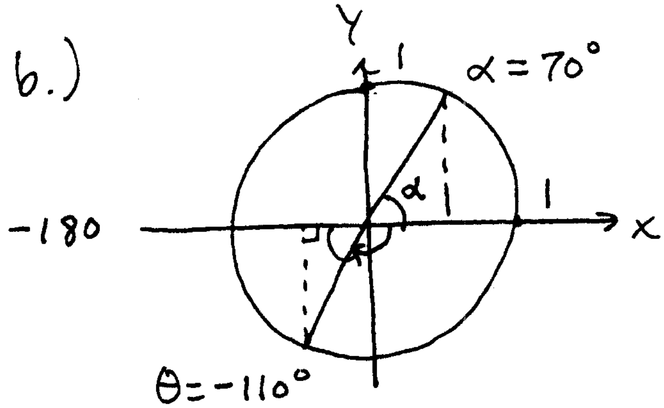
Section 6.3

1) a.)



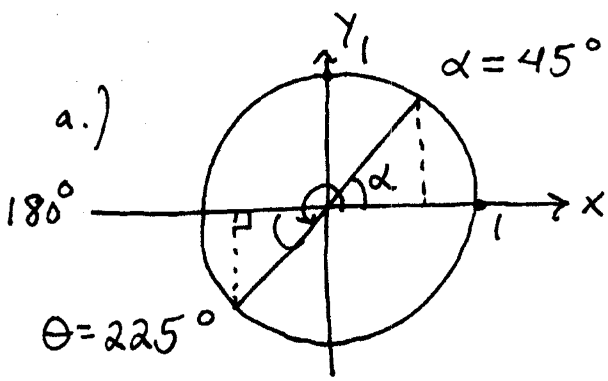
reference angle
$\alpha = 70°$

b.)



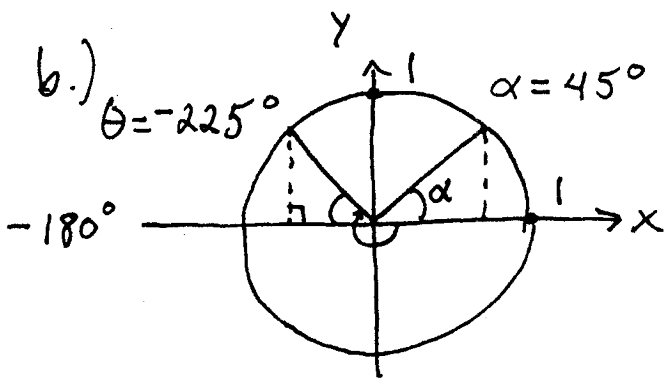
reference angle
$\alpha = 70°$

4) a.)



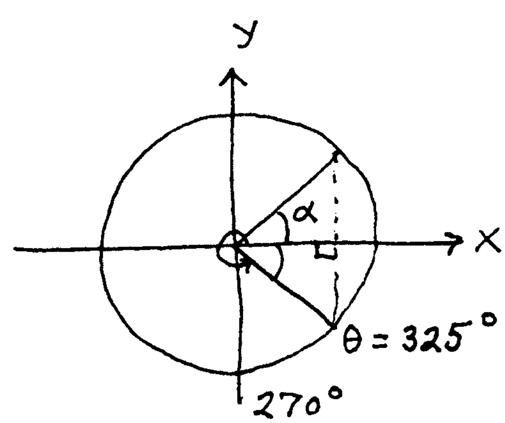
reference angle
$\alpha = 45°$

b.)

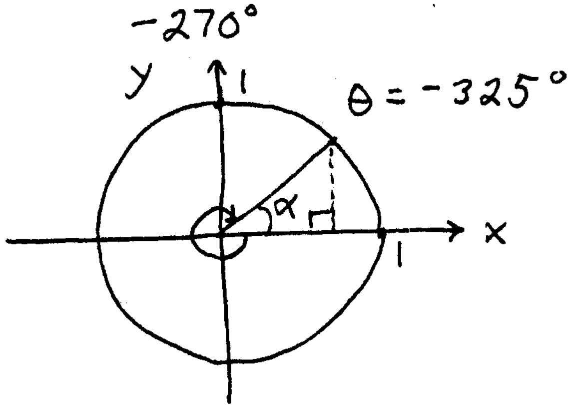


reference angle
$\alpha = 45°$

6) a.) reference angle
$\alpha = 45°$

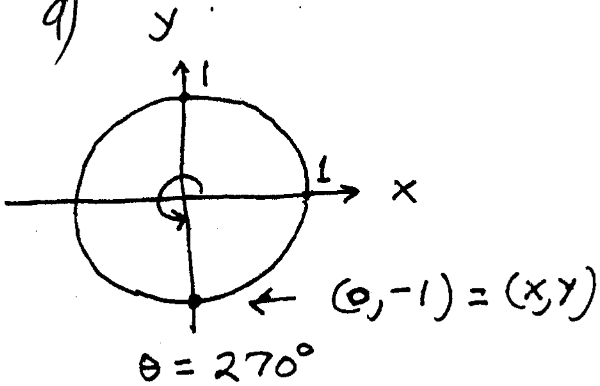


b.)



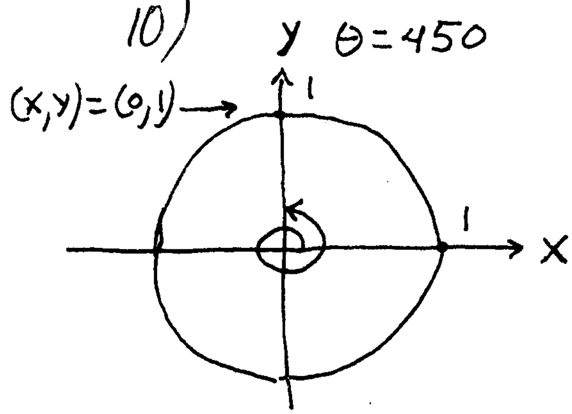
reference angle $\alpha = 45°$

9)



$\cos 270° = \frac{x}{1} = \frac{0}{1} = 0$,
$\sin 270° = \frac{y}{1} = \frac{-1}{1} = -1$,
$\tan 270° = \frac{y}{x} = \frac{-1}{0}$ (undefined),
$\sec 270° = \frac{1}{0}$ (undefined),
$\csc 270° = \frac{1}{-1} = -1$,
$\cot 270° = \frac{0}{-1} = 0$

10)



$\cos 450° = \frac{0}{1} = 0$,
$\sin 450° = \frac{1}{1} = 1$,
$\tan 450° = \frac{1}{0}$ (undefined),
$\sec 450° = \frac{1}{0}$ (undefined),
$\csc 450° = \frac{1}{1} = 1$,
$\cot 450° = \frac{0}{1} = 0$

15) $\sin 10° \approx 0.2$, <u>calc</u>: $\sin 10° \approx 0.17$;
$\sin(-10°) \approx -0.2$, <u>calc</u>: $\sin(-10°) \approx -0.17$

18) $\sin 80° \approx 1.0$, <u>calc</u>: $\sin 80° \approx 0.98$;
$\sin(-80°) \approx -1.0$, <u>calc</u>: $\sin(-80°) \approx -0.98$

19) $\sin 120° \approx 0.9$, <u>calc</u>: $\sin 120° \approx 0.87$,
$\sin(-120°) \approx -0.9$, <u>calc</u>: $\sin(-120°) \approx -0.87$

21) $\sin 150° \approx 0.5$, <u>calc</u>: $\sin 150° \approx 0.50$;
$\sin(-150°) \approx -0.5$, <u>calc</u>: $\sin(-150°) \approx -0.50$

24) $\sin 220° \approx {}^{-}0.6$, <u>calc</u>: $\sin 220° \approx {}^{-}0.64$;
$\sin(-220°) \approx 0.6$, <u>calc</u>: $\sin(-220°) \approx 0.64$

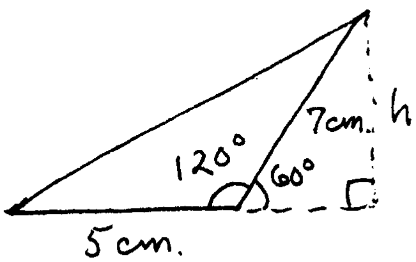
51)

θ	$\cos\theta$	$\sin\theta$	$\tan\theta$
$0°$	1	0	0
$30°$	$\sqrt{3}/2$	$1/2$	$1/\sqrt{3}$
$45°$	$\sqrt{2}/2$	$\sqrt{2}/2$	1
$60°$	$1/2$	$\sqrt{3}/2$	$\sqrt{3}$
$90°$	0	1	undefined
$120°$	$-1/2$	$\sqrt{3}/2$	$-\sqrt{3}$
$135°$	$-\sqrt{2}/2$	$\sqrt{2}/2$	-1
$150°$	$-\sqrt{3}/2$	$1/2$	$-1/\sqrt{3}$
$180°$	-1	0	0

52)

θ	$\cos\theta$	$\sin\theta$	$\tan\theta$
$180°$	-1	0	0
$210°$	$-\sqrt{3}/2$	$-1/2$	$1/\sqrt{3}$
$225°$	$-\sqrt{2}/2$	$-\sqrt{2}/2$	1
$240°$	$-1/2$	$-\sqrt{3}/2$	$\sqrt{3}$
$270°$	0	-1	undefined
$300°$	$1/2$	$-\sqrt{3}/2$	$-\sqrt{3}$
$315°$	$\sqrt{2}/2$	$-\sqrt{2}/2$	-1
$330°$	$\sqrt{3}/2$	$-1/2$	$-1/\sqrt{3}$
$360°$	1	0	0

53)



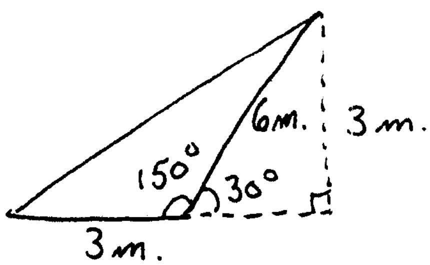
$\sin 60° = h/7 \rightarrow$

$h = 7 \sin 60° = 7 \cdot \sqrt{3}/2 \rightarrow$

$A = \frac{1}{2}(5)(7 \cdot \sqrt{3}/2) \rightarrow$

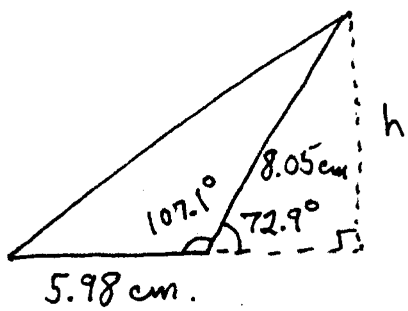
$A = 35\sqrt{3}/4$ cm.^{2}

54)



$A = \frac{1}{2}(3)(3) = \frac{9}{2}$ m.^{2}

56)



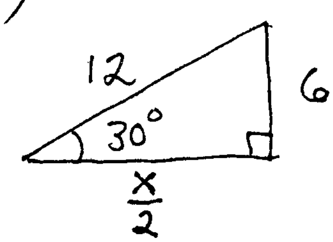
$\sin 72.9° = h/8.05 \rightarrow$

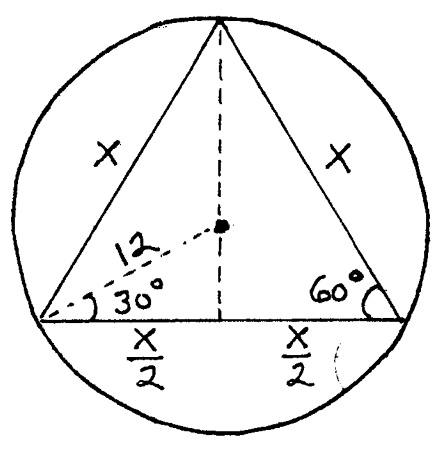
$h = 8.05 \sin 72.9° \approx 7.7$ cm. $\rightarrow$

$A = \frac{1}{2}(5.98)(7.7)$

≈ 23.0 cm.^{2}

57)



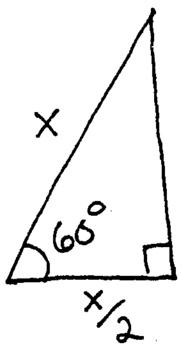


By Pythagorean Theorem

$(x/2)^2 + 6^2 = 12^2 \rightarrow \frac{x^2}{4} = 144 - 36 = 108 \rightarrow$

$x^2 = 432 \rightarrow x = \sqrt{432} = \sqrt{16 \cdot 9 \cdot 3} = (4)(3)\sqrt{3}$

$\rightarrow \boxed{x = 12\sqrt{3}}$ cm.; then



$h^2 + \left(\frac{x}{2}\right)^2 = x^2 \rightarrow$

$h^2 = x^2 - \frac{1}{4}x^2 = \frac{3}{4}x^2 \rightarrow$

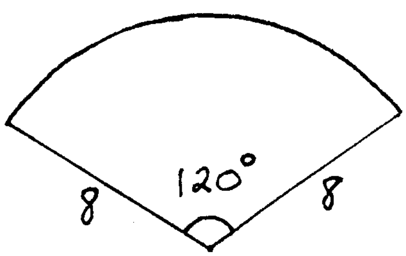
$h = \frac{\sqrt{3}}{2}x = \frac{\sqrt{3}}{2} \cdot 12\sqrt{3} = 6 \cdot 3 = 18$

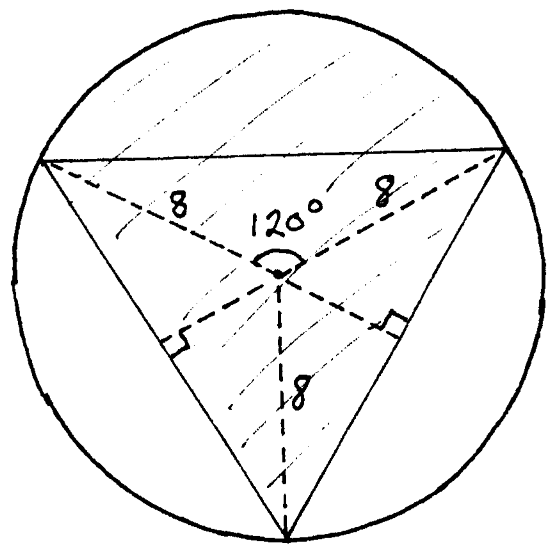
$\rightarrow \boxed{h = 18 \text{ cm.}}$;

$A = \frac{1}{2}(x)(h) = \frac{1}{2}(12\sqrt{3})(18) = 108\sqrt{3} \text{ cm.}^2$

$\approx 187.06 \text{ cm.}^2$

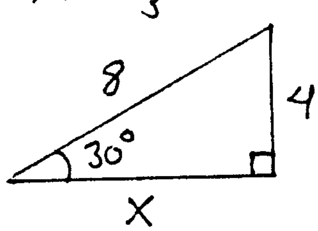
58b)





The area of the above sector is $\frac{1}{3}$ (why?) the area of a full circle :

$A = \frac{1}{3}\pi(8)^2 \approx 67.021 \text{ cm.}^2$;



$x^2 + 4^2 = 8^2 \rightarrow x^2 = 64 - 16 = 48$

$\rightarrow x = \sqrt{48} = \sqrt{16 \cdot 3} = 4\sqrt{3}$ so

area of FOUR right triangles is:

$A = 4 \cdot \frac{1}{2}(x)(4) = \frac{4}{2}(4\sqrt{3})(4) = 32\sqrt{3} \approx 55.426 \text{ cm.}^2$;

TOTAL AREA $= 122.447 \text{ cm.}^2$

60) a.)

θ:	$89°$	$89.9°$	$89.99°$	$89.999°$
$\tan\theta$:	57	573	5730	57,296

b.)

θ:	$91°$	$90.1°$	$90.01°$	$90.001°$
$\tan\theta$:	-57	-573	-5730	-57.296

63)

$\sin(180° - \theta) = \frac{h}{1} \rightarrow$

$h = \sin(180° - \theta)$

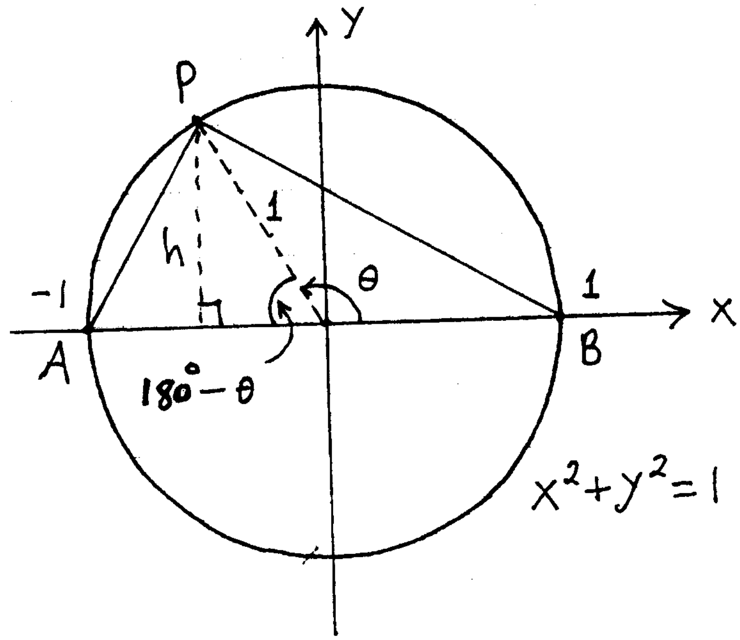
$= \sin\theta$ so

area of $\triangle ABP$ is

$A = \frac{1}{2}(2)(h)$

$= h = \sin\theta \longrightarrow$

$A = \sin\theta$



69b)

$\cos^2\theta + \sin^2\theta = 1 \rightarrow$

$\sin^2\theta = 1 - \cos^2\theta \rightarrow$

$(\sin\theta)^2 = (1-\cos\theta)(1+\cos\theta) \rightarrow$

$\ln(\sin\theta)^2 = \ln(1-\cos\theta)(1+\cos\theta) \rightarrow$

$2\ln(\sin\theta) = \ln(1-\cos\theta) + \ln(1+\cos\theta) \rightarrow$

$\ln(\sin\theta) = \frac{1}{2}\ln(1-\cos\theta) + \frac{1}{2}\ln(1+\cos\theta) \rightarrow$

$\ln(\sin\theta) = \ln(1-\cos\theta)^{1/2} + \ln(1+\cos\theta)^{1/2} \rightarrow$

$\ln(\sin\theta) = \ln\sqrt{1-\cos\theta} + \ln\sqrt{1+\cos\theta}$