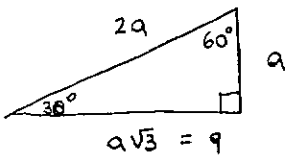
EXAM 3 REVIEW Key

#6



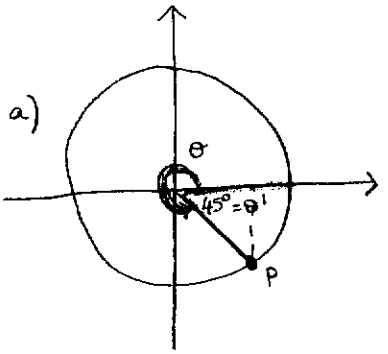
$a\sqrt{3} = 9$

$a = \frac{9}{\sqrt{3}} = \frac{9}{\sqrt{3}} * \frac{\sqrt{3}}{\sqrt{3}} = \frac{9\sqrt{3}}{3} = 3\sqrt{3}$

shorter leg $= 3\sqrt{3}$
hypotenuse $= 6\sqrt{3}$

#7

a)



b) Quadrant 4

c) $315\frac{\pi}{180} = \frac{315\pi}{180} = \frac{7\pi}{4}$

d) $\theta' = 360° - 315° = 45°$

e) $P\left(\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}\right)$ (from special triangle)

#8

$x^2 - y^2 = 3$
$2x + y^2 = 5$
$x^2 + 2x = 8$

Add to eliminate y

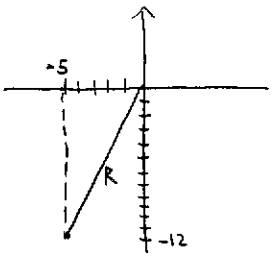
$x^2 + 2x - 8 = 0$
$(x+4)(x-2) = 0$
$x = -4$
$x = 2$

When $x = 2$ using $x^2 - y^2 = 3$ $\quad 4 - y^2 = 3 \quad y^2 = 1 \quad y = \pm 1$

When $x = -4$ $\quad (-4)^2 - y^2 = 3 \quad 16 - y^2 = 3 \quad y^2 = 13 \quad y = \pm\sqrt{13}$

$(2,1)$ $(2,-1)$
$(-4, \sqrt{13})$ $(-4, -\sqrt{13})$

#9 Since $\tan\theta > 0$ and $\sin\theta < 0$ the terminal side of θ is in quadrant 3



$x < 0 \quad y < 0 \quad R > 0$

$\tan\theta = \frac{y}{x} = \frac{12}{5}$ so $x = -5$, $y = -12$ since x and y are both negative

$R^2 = (-5)^2 + (-12)^2 = 25 + 144 = 169$

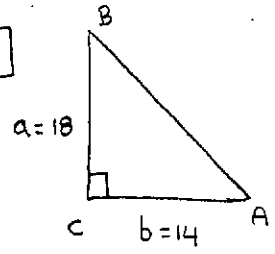
$R = \sqrt{169} = 13$

$\sin\theta = \frac{y}{R} = -\frac{12}{13}$ $\quad \csc\theta = -\frac{13}{12}$

$\cos\theta = \frac{x}{R} = -\frac{5}{13}$ $\quad \sec\theta = -\frac{13}{5}$

$\tan\theta = \frac{y}{x} = \frac{12}{5}$ $\quad \cot\theta = \frac{5}{12}$

#10

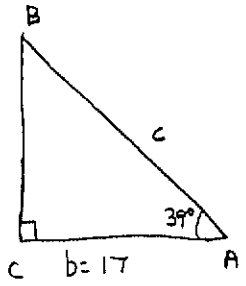


$\tan A = \frac{18}{14} = \frac{9}{7}$

$A = \tan^{-1}\left(\frac{9}{7}\right) = 52.12501635$ ↓ calculator

$\boxed{A = 52.1^\circ}$

#11



$\cos(39^\circ) = \frac{17}{c}$

$c\cos(39^\circ) = 17$

$c = \frac{17}{\cos(39^\circ)} = 21.87491262$

$\boxed{c = 21.875}$

#12 $\frac{1}{\cos x} - \frac{1}{\sec x} = \frac{1}{\cos x} - \cos x = \frac{1-\cos^2 x}{\cos x} = \frac{\sin^2 x}{\cos x} = \sin x\left(\frac{\sin x}{\cos x}\right) = \sin x \tan x$

#13 $\log_3 \frac{1}{81} = x$

$3^x = \frac{1}{81}$ $\quad 81 = 3^4$

$3^x = 3^{-4}$ $\quad \boxed{x = -4}$

#14 $5^{(2x+1)} = 5^2$ $\quad 2x+1 = 2$ $\quad 2x = 1$ $\quad \boxed{x = \frac{1}{2}}$

#15 $7^x = 63$

$\log(7^x) = \log 63$

$x \log 7 = \log 63$

$x = \frac{\log 63}{\log 7} = 2.129150068$

$\boxed{x = 2.1}$

#16 $\log_4\left(64\sqrt[5]{4}\right) = \log_4 64 + \log_4 \sqrt[5]{4} = 3 + \frac{1}{5} = \frac{15}{5} + \frac{1}{5} = \boxed{\frac{16}{5}}$

$\log_4 64 = 3$ because $4^3 = 64$

$\sqrt[5]{4} = 4^{1/5}$ so $\log_4 \sqrt[5]{4} = \log_4 4^{1/5} = \frac{1}{5}$

#17 $3\log x - 7\log y + 11\log z = \log x^3 - \log y^7 + \log z^{11} = \log x^3 + \log z^{11} - \log y^7 =$

$\boxed{\log\left(\frac{x^3 z^{11}}{y^7}\right)}$