Monday, April 6, 2026 11:25 AM

Wednesday Exam 3 @ 8pm
ES2107

Final Exam Tues. 5/5 @ 8am - 10am
LD136

(4b) $\log_3 7 = x$

$3 \qquad 3$

Ans: $7 = 3^x$

(4a) $\ln(5) = x$

$e \qquad e$

$5 = e^x$

(4c) $f(x) = \log_5(x)$

$$f^{-1}(x) = 5^x$$

(4g) $f(x) = \ln(x)$

$$f^{-1}(x) = e^x$$

(4h) $f(x) = \log(x)$

$$f^{-1}(x) = 10^x$$

(5c) $$\ln\left(\frac{m}{np}\right)^4 = \ln\left(\frac{m^4}{n^4 p^4}\right)$$

$$= \ln(m^4) - \ln(n^4) - \ln(p^4)$$

$$= 4\ln(m) - 4\ln(n) - 4\ln(p)$$

(5d) $$\log_5\left(\frac{a^4 b^4}{c^2}\right)^{1/2} = \log_5\left(\frac{(a^4)^{1/2}(b^4)^{1/2}}{(c^2)^{1/2}}\right)$$

$$= \log_6\left(\frac{a^2 b^2}{c}\right)$$

$$= \log_5(a^2) + \log_5(b^2)$$

$$= \log_5(a^2) + \log_5(b^2) - \log_5(c)$$

$$= 2\log_5(a) + 2\log_5(b) - \log_5(c)$$

(1c) $f(x) = \frac{1}{2}x + 6$

$$x = \frac{1}{2}y + 6$$

$$x - 6 = \frac{1}{2}y$$

$$2(x-6) = y$$

$$y = 2x - 12 = f^{-1}(x)$$

(1e) $f(x) = x^3 + 1$

$$x = y^3 + 1$$

$$x - 1 = y^3$$

$$\sqrt[3]{x-1} = y$$

$f(x) = y$ then $f^{-1}(y) = x$

vice versa

vice versa

(2a) $f(5) = -2$ $\quad f^{-1}(-2) = ? = 5$

(2e) $f^{-1}(-3) = 1$ $\quad f(1) = -3$

(3a-d) Plug & chug

(3e-h) Remember for logs & ln the inside needs to be > 0.

(3e) $\log_3(-3)$ DNE

(3g) $\ln(-1)$ DNE

(3h) $\ln(1) = 0$

(6b) $\log_3(x^2+4) = \log_3(13)$

$$x^2 + 4 = 13$$
$$-4 \quad -4$$
$$x^2 = 9$$
$$x = \pm 3$$

Check $x = \pm 3$ works in the

Check $x = \pm 3$ works in the original eqn. ✓

Bonus: $\log_9(x^2+x) = \log_9(12)$

$$x^2+x = 12$$
$$x^2+x-12 = 0$$
$$(x+4)(x-3) = 0$$
$$x = -4, 3$$

Check $x = -4, 3$ work in the original eqn. ✓

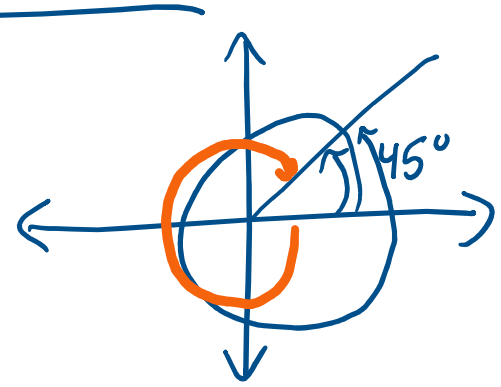
(7a) $e^{x^2} = e^{3x-4}$

$$x^2 = 3x-4$$
$$x^2-3x+4 = 0$$
$$(x-4)(x-1) = 0$$
$$x = 1, 4$$

Coterminal:

(A) ↑ ✓

(A)



$45° + 360° = 405°$

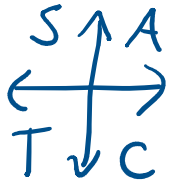
$45° - 360° = -315°$

(B) $\theta = \pi/4$

$\frac{\pi}{4} + 2\pi = \frac{9\pi}{4}$

$\frac{\pi}{4} - 2\pi = -\frac{7\pi}{4}$

	0	$\pi/6$	$\pi/4$	$\pi/3$	$\pi/2$
Sin	0	$1/2$	$\sqrt{2}/2$	$\sqrt{3}/2$	1
Cos	1	$\sqrt{3}/2$	$\sqrt{2}/2$	$1/2$	0



(8g) $(\sqrt{3}/2, 1/2)$

$\uparrow$

$(\cos, \sin)$

$\theta = \frac{\pi}{6}$

(8h) $\left(-\sqrt{2}/2, \sqrt{2}/2\right)$

(cos, sin)

$\theta_R = \pi/4$

$\theta = \pi - \frac{\pi}{4}$

$= \frac{3\pi}{4}$

(9) Reference Angle

Q1: Do nothing

Q2: $180° - \theta$ (or $\pi - \theta$)

Q3: $\theta - 180°$ (or $\theta - \pi$)

Q4: $360° - \theta$ (or $2\pi - \theta$)

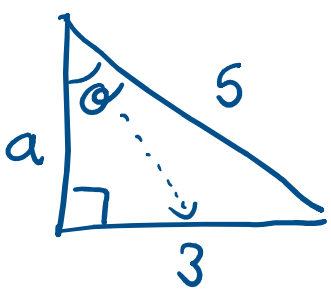
(a) $\theta_R = \theta = 35°$

(b) $\theta_R = 180° - 145°$
$= 35°$

(c) $\theta_R = 215° - 180°$
$= 35°$

(d) $\theta_R = 360° - 330°$
$= 30°$

(10a)

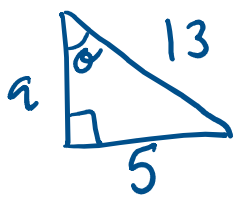


$\sin\theta = \frac{opp}{hyp} = \frac{3}{5}$

$\tan\theta = \frac{opp}{adj} = \frac{3}{4}$

$\sec\theta = \frac{5}{4}$

(10b)



$\tan\theta = \frac{opp}{adj} = \frac{5}{a} = \frac{5}{12}$

$a^2 + 5^2 = 13^2$

$a^2 + 25 = 169$

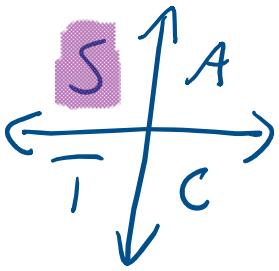
$-25 \quad -25$

$a^2 = 144$

$a = 12$

(11b) $\sec\theta = ?$ If $\cos\theta = -4/5$ and $\sin\theta > 0$

$= -?$

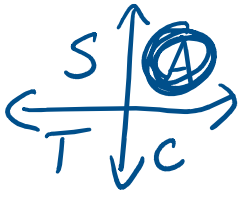


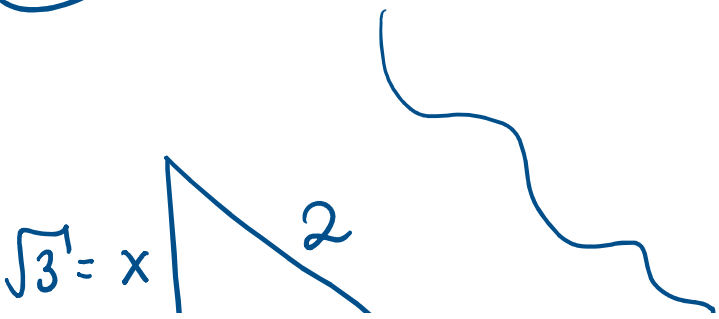
$\sec\theta = \frac{1}{\cos\theta}$

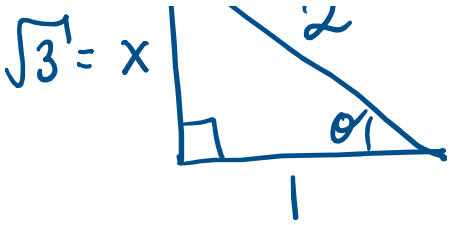
$\sec\theta = \frac{1}{-4/5}$

$\sec\theta = -5/4$

(11f) $\cot\theta = ?$ If $\cos\theta = 1/2$ and $\sin\theta > 0$







$$x^2 + 1^2 = 2^2$$

$$x^2 + 1 = 4$$

$$x^2 = 3$$

$$x = \sqrt{3}$$

$$\cot\theta = \frac{1}{\tan\theta}$$

$$= \frac{\text{adj}}{\text{opp}}$$

$$= \frac{1}{\sqrt{3}}$$