

#1

$$f(x) = \sqrt{x+2} + \sqrt{2-x}$$

$$x+2 \geq 0$$

AND

$$2-x \geq 0$$

$$x \geq -2$$

$$2 \geq x$$

$$\text{domain: } -2 \leq x \leq 2$$

#2

$$y = 4^{x-3} + 1$$

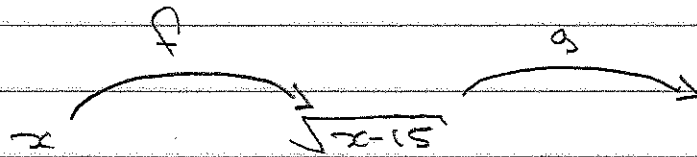
3 to the right  
1 up

3 to the right

#3a

$$\begin{aligned}g \circ f(x) &= g(f(x)) = g(\sqrt{x-15}) \\ &= (\sqrt{x-15})^2 + 2\sqrt{x-15} \\ &= x-15 + 2\sqrt{x-15}\end{aligned}$$

#3b



DOMAINS

$$x-15 \geq 0 \\ x \geq 15$$

all reals

DOMAIN  $x \geq 15$

#4

$$\begin{aligned}f(x): \quad y &= \sqrt{3-x}, \quad x \leq 3, \quad y \geq 0 \\ y^2 &= 3-x \\ x &= 3-y^2\end{aligned}$$

$$f^{-1}(x): \quad y = 3-x^2, \quad x \geq 0, \quad y \leq 3$$

#5a

set  $x=0$

undefined - none

#5b

set  $y=0$

$$0 = \frac{2x^2 + 8x + 6}{x^2 - 2x}$$

$$0 = 2x^2 + 8x + 6$$

$$0 = 2(x^2 + 4x + 3)$$

$$0 = 2(x+3)(x+1)$$

$$x = -3 \quad x = -1$$

#5c

$$\text{As } x \rightarrow \pm \infty \quad y \rightarrow \frac{2x^2}{x^2} = 2 \quad y = 2$$

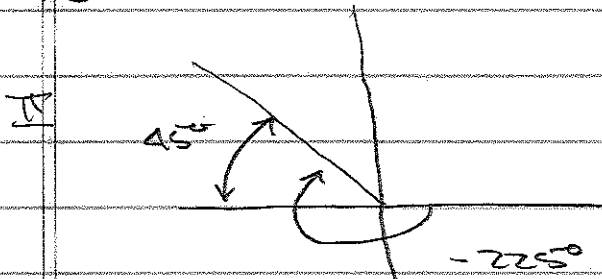
#5d

$$x^2 - 2x = 0$$

$$x(x-2) = 0$$

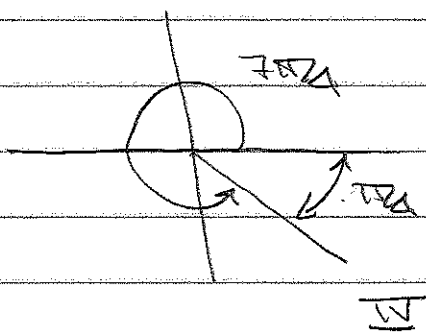
$$x = 0 \quad x = 2$$

#6



$$\cos(-225^\circ) = -\cos 45^\circ = -\frac{1}{\sqrt{2}}$$

#7



$$\cos 7\pi/4 = \cos \pi/4 = \sqrt{2}/2$$

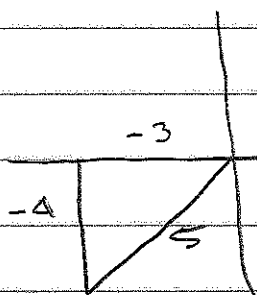
#8

$$\cot \theta = 3/4 \quad \cos \theta < 0$$

I { III

II { III

III



$$\sin \theta = -4/5$$

$$\csc \theta = -5/4$$

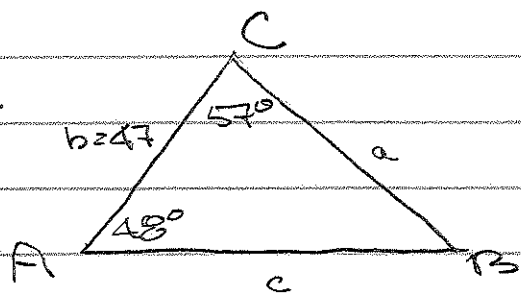
$$\cos \theta = -3/5$$

$$\sec \theta = -5/3$$

$$\tan \theta = 4/3$$

$$\cot \theta = 3/4$$

#9



$$A = 48^\circ$$

$$a \approx 36.2$$

$$B = 75^\circ$$

$$b = 47$$

$$C = 57^\circ$$

$$c \approx 40.8$$

$$\Delta \quad 180^\circ$$

$$A \quad - 57^\circ$$

$$C \quad - 48^\circ$$

$$B \quad 75^\circ$$

$$\frac{\sin 48^\circ}{a} = \frac{\sin 75^\circ}{47}$$

$$a = \frac{47 \sin 48^\circ}{\sin 75^\circ}$$

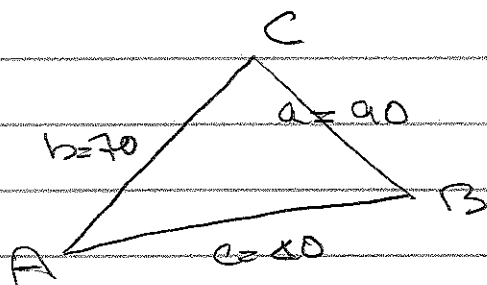
$$a \approx 36.2$$

$$\frac{\sin 57^\circ}{c} = \frac{\sin 75^\circ}{47}$$

$$c = \frac{47 \sin 57^\circ}{\sin 75^\circ}$$

$$c \approx 40.8$$

#10



$$A = 106.6^\circ$$

$$a = 90$$

$$B = 48.1^\circ$$

$$b = 70$$

$$C = 25.3^\circ$$

$$c = 40$$

$$90^2 = 70^2 + 40^2 - 2 * 70 * 40 \cos A$$

$$\cos A = \frac{90^2 - 70^2 - 40^2}{-2 * 70 * 40}$$

$$A \approx 106.6^\circ$$

$$\frac{\sin B}{70} = \frac{\sin 106.6^\circ}{90}$$

$$\sin B = \frac{70 \sin 106.6^\circ}{90}$$

$$B \approx 48.1^\circ$$

$$\Delta \quad 180^\circ$$

$$A \quad - 106.6^\circ$$

$$B \quad - 48.1^\circ$$

$$C \approx 25.3^\circ$$

#11

$$y = -3 \sin\left(\frac{1}{2}x - \frac{\pi}{2}\right)$$

$$= -3 \sin\left[\frac{1}{2}\left(x - \frac{\pi}{2}\right)\right]$$

Amplitude

$$|-3| = 3$$

period

$$2\pi \left(\frac{1}{2}\right) = 4\pi$$

phase shift

 $\frac{\pi}{2}$  to right

#12

$$\frac{1 + \sec x}{\sin x + \tan x} = \frac{1 + \frac{1}{\cos x}}{\sin x + \frac{\sin x}{\cos x}}$$

$$= \frac{1 + \frac{1}{\cos x}}{\sin x \left(1 + \frac{1}{\cos x}\right)}$$

$$= \frac{1}{\sin x}$$

$$= \csc x$$

#13

$$\Delta \sin^2 x - 3 = 0$$

$$\sin^2 x = 3/4$$

$$\sin x = \pm \sqrt{3}/2$$

$$\sin x = \sqrt{3}/2$$

$$\sin x = -\sqrt{3}/2$$

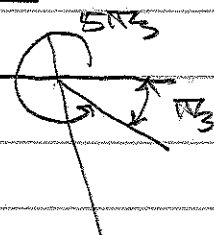
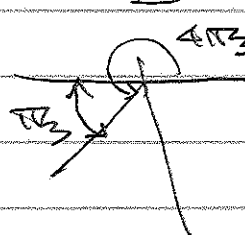
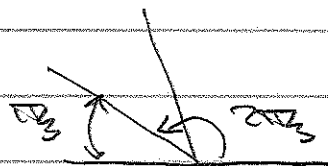
ref angle  
quad

$\pi/3$

$\pi/3$

I & II

III & IV



$$\pi/3 + k2\pi$$

$$2\pi/3 + k2\pi$$

$$4\pi/3 + k2\pi$$

$$5\pi/3 + k2\pi$$

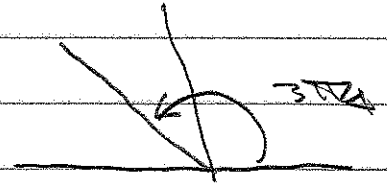
#14

$$\cos 112.5^\circ = \cos \frac{225^\circ}{2} = -\sqrt{\frac{1 + (-\sqrt{2})}{2}}$$

#15

$$\tan \frac{3\pi}{4} \\ = -1$$

$\overline{II}$



$$\sin^{-1}(-1) = -\frac{\pi}{2}$$

#16

$$\log_2 128 = \log_2 2^7 = 7$$



#17

$$e^{1+\ln 5} = e^1 e^{\ln 5} = e \cdot 5 = 5e$$

#18

$$\begin{aligned} & 5 \ln x - \frac{1}{2} \ln(3x-4) - 3 \ln(5x+1) \\ &= \ln x^5 - \ln \sqrt{3x-4} - \ln (5x+1)^3 \\ &= \ln \frac{x^5}{\sqrt{3x-4} (5x+1)^3} \end{aligned}$$

#19

$$\log_3 3x = \log_3 x + \log_3 (4-x)$$

$$\log_3 3x = \log_3 x(4-x)$$

$${}_3 \log_3 3x = {}_3 \log_3 x(4-x)$$

$$3x = x(4-x)$$

$$3x = 4x - x^2$$

$$x^2 - x = 0$$

$$x(x-1) = 0$$

$$x \neq 0 \quad x = 1$$

#20

$$e^{2x} + 2e^x - 15 = 0$$

$$(e^x + 5)(e^x - 3) = 0$$

$$e^x + 5 = 0$$

$$e^x - 3 = 0$$

$$e^x \neq -5$$

$$e^x = 3$$

$$\ln e^x = \ln 3$$

$$x = \ln 3$$