

1. Calculate the following if exists.

a-) (4 points) $\sin\left(\frac{5\pi}{12}\right) = ?$

$\frac{\pi}{6} + \frac{\pi}{4} \rightarrow \sin(a+b) = \sin a \cdot \cos b + \sin b \cdot \cos a$

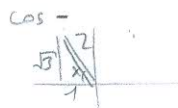
$= \sin\frac{\pi}{6} \cdot \cos\frac{\pi}{4} + \sin\frac{\pi}{4} \cdot \cos\frac{\pi}{6}$

$= \frac{1}{2} \cdot \frac{1}{\sqrt{2}} + \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{3}}{2}$

$= \frac{1}{2\sqrt{2}} + \frac{\sqrt{3}}{2\sqrt{2}} = \frac{1+\sqrt{3}}{2\sqrt{2}} = \frac{\sqrt{2}+\sqrt{6}}{4}$

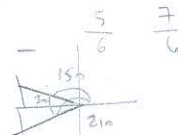
b-) (4 points) $\cos\left(\frac{2\pi}{3}\right) = ?$

$\frac{-1}{2}$



c-) (4 points) $\cos^{-1}\left(\frac{-\sqrt{3}}{2}\right) = ?$

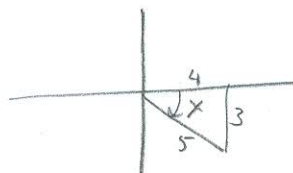
$\frac{5\pi}{6}$



d-) (4 points) $\sin^{-1}(2) = ?$ ONE

$-1 \leq \sin x \leq 1$

e-) (8 points) $\sin\left(\tan^{-1}\left(\frac{-3}{4}\right)\right) = ?$



$\tan^{-1}\left(\frac{-3}{4}\right) = x$

$\tan x = \frac{-3}{4}$

$-\frac{\pi}{2} < x < 0$

$1 + \tan^2 x = 1 + \frac{9}{16} = \frac{25}{16} = \sec^2 x$

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

$\cos x = \frac{4}{5}$

$\sin x = \cos x \cdot \tan x = \frac{4}{5} \times \frac{-3}{4} = \frac{-3}{5}$

2. (12 points) Solve the following equation

$$\log(-x) + \log(-3x-2) = x - \log 10^x$$

$$\log(-x) + \log(-3x-2) = x - x \log 10$$

$$\log(-x(-3x-2)) = x - x = 0$$

$$3x^2 + 2x = 10^0 = 1$$

$$3x^2 + 2x - 1 = 0$$

$$\begin{array}{r} 1 \\ 3 \end{array} \quad \begin{array}{r} 1 \\ -1 \end{array}$$

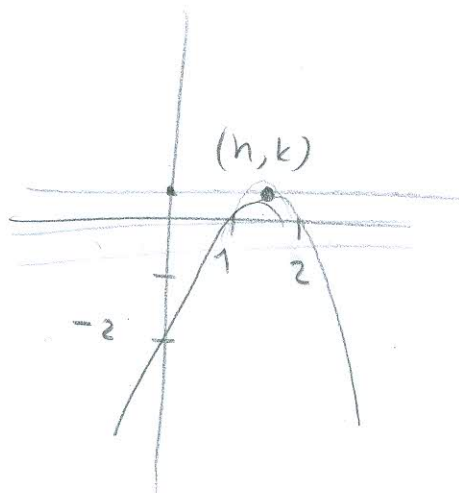
$$(3x-1)(x+1) = 0$$

$x = \frac{1}{3}$ not in the domain of $\log(-x)$

$$x_2 = -1$$

$$SS = \{-1\}$$

3. (15 points) Find the domain and range of a parabola with x -intercepts 1 and 2 and y -intercept -2 .



$$y = m(x-1)(x-2)$$

$$-2 = m(0-1)(0-2)$$

$$m = -1$$

$$y = -1(x-1)(x-2)$$

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

$$h = \frac{-b}{2a} = \frac{-3}{-2} = \frac{3}{2}$$

$$y = -\left(\frac{3}{2}\right)^2 + 3 \cdot \frac{3}{2} - 2 = -\frac{9}{4} + \frac{9}{2} - 2 = \frac{1}{4}$$

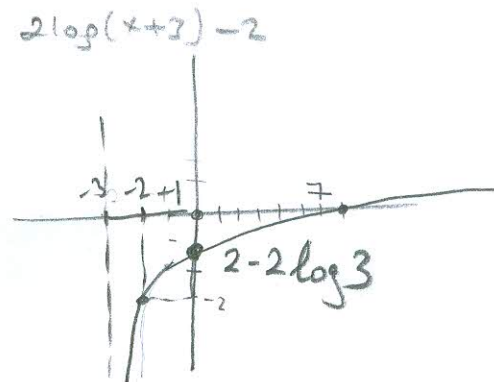
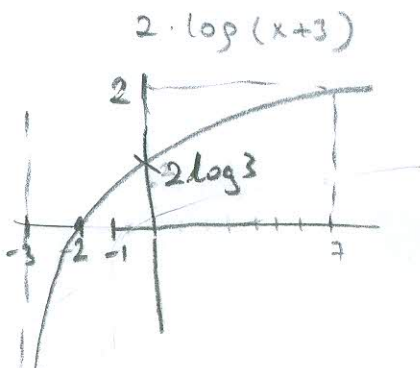
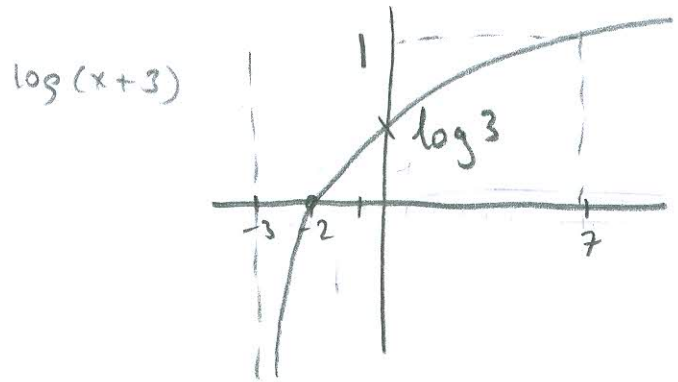
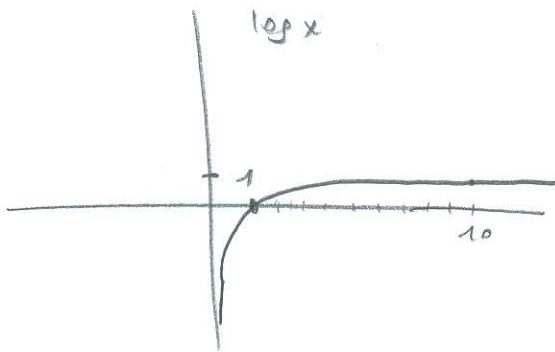
$$D = \mathbb{R}$$

$$R = (-\infty, k]$$

$$\left(-\infty, \frac{1}{4}\right]$$

$$\frac{-9+18}{4}$$

4. (15 points) Sketch the graph of $f(x) = 2 \log(x+3) - 2$ by using horizontal translation, vertical translation, stretch and shrink where it is appropriate. Indicate each step. Specify x and y intercepts.



5. (15 points) Find all values of x in the interval $[-2\pi, 2\pi]$ so that $\sin 2x - \cos x = 0$.

$$\sin 2x - \cos x = 0$$

$$2 \sin x \cos x - \cos x = 0$$

$$\cos x (2 \sin x - 1) = 0$$

$$\cos x = 0$$

$$x = \frac{\pi}{2} + \pi k$$

$$\sin x = \frac{1}{2}$$

$$x = \frac{\pi}{6} + 2\pi k$$

$$x = \frac{5\pi}{6} + 2\pi k$$

$$SS = \left\{ \frac{\pi}{2}, \frac{3\pi}{2}, -\frac{\pi}{2}, -\frac{3\pi}{2}, \frac{\pi}{6}, \frac{5\pi}{6}, -\frac{11\pi}{6}, -\frac{7\pi}{6} \right\}$$

6. You have 1000TL to invest for 9 months.

a-) (10 points) YapıKredi bank offers 40% compounded quarterly for your bank account.

How much would you have at the end of 9 months if you invest your money in this account?

$$P = 1000$$

$$t = 9 \text{ month} = \frac{9}{12} \text{ year} = \frac{3}{4}$$

$$r = 40\% \text{ quarterly}$$

$$A = ?$$

$$i = \frac{0.4}{4} = 0.1$$

$$A = P(1+i)^n$$

$$A = 1000(1+0.1)^3 = 1000(1.1)^3 = 1331 \text{ TL}$$

b-) (10 points) A friend of yours wants to borrow your money at 44% simple interest (nominal annual interest rate) for 9 months. Is this a better investment?

$$A = 1000$$

$$r = 44\%$$

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

$$A = P(1+t \cdot r)$$

$$A = 1000\left(1 + \frac{3}{4} \times 0.44\right) = 1000(1 + 0.33) = 1330 \text{ TL}$$

YapıKredi's offer is better.