

تکلیف ۲۷ ۱۰

$$f(0) = 1 + 0 + b = 0 \Rightarrow b = -1$$

$$\lim_{n \rightarrow 0} \frac{f'(n)}{n} = \frac{r \cos n \times (-r \sin n) + r a n}{n} \stackrel{L'Hop}{=} r \cos n \times r \cos n + r a = r$$

$$\Rightarrow a = r \Rightarrow a + b = r \checkmark$$

$$r n = \pm 1 \Rightarrow n = \pm \frac{1}{r} \Rightarrow y = \frac{1}{r} - 1 \Rightarrow y = \frac{1}{r} - 1 \checkmark$$

$$y - y = \frac{r n - 1}{-r n - 1} (n - r n) \Rightarrow y = r n - 1$$

$$r n - 1 = \frac{1}{r n - 1} \Rightarrow 1 = (r n - 1)^2 \Rightarrow r n - 1 = \pm 1$$

$$\Rightarrow f'(n) = \frac{-r}{(r n - 1)^2} = r \Rightarrow \frac{-r (r n - 1)}{(r n - 1)^2} = r$$

$$\Rightarrow n = 1 \Rightarrow 1 = -r \Rightarrow f(n) = \frac{-r}{1} = -r \checkmark$$

$$y' = \frac{r - a}{(a n + 1)^2} \Rightarrow \frac{1 - a}{(a + 1)^2} = r \Rightarrow r a^2 + (a + 1) = 0 \Rightarrow a = \frac{1}{r} - 1$$

$$\frac{1}{r} = r + b \Rightarrow b = -1 \Rightarrow -\frac{1}{r} + 1 = \frac{1}{r} \checkmark$$

$$\sin n + \frac{1}{r} \cos n = \frac{r}{2} \sin n \Rightarrow \cos n = \sin n \Rightarrow n = \frac{\pi}{4}$$

$$f(n) = \cos n - \frac{1}{r} \sin n \Rightarrow f\left(\frac{\pi}{4}\right) = \frac{\sqrt{2}}{2} - \frac{\sqrt{2}}{2} = 0$$

$$y = \frac{\sqrt{2}}{2} = \frac{\sqrt{2}}{2} \left(n - \frac{\pi}{4}\right) \Rightarrow \frac{\sqrt{2}}{2} \left(n - \frac{\pi}{4}\right) = 0$$

$$n - \frac{\pi}{4} = 0 \Rightarrow n = \frac{\pi}{4} \checkmark$$

سوال 9

f'(u) = 4u^2 - 4u - 12 = 0 -> 2u^2 - u - 3 = 0 -> (u-2)(2u+1) = 0

Table with columns u, -1, 2 and rows y', y. Signs are +, -, +. Arrows indicate max and min.

A | -1 B | 2 -> M\_AB = (1 - (-12)) / (-1 - 2) = -4

f'(u) = 4u^2 - 4u - 12 = -4 -> 4u^2 - 4u - 8 = 0 -> u^2 - u - 2 = 0 -> در نقطه 1 است

y = Kx^2 + (K+1)x -> y' = 2Kx + (K+1) -> y'' = 2K > 0 -> K > 0

سوال 10

u = (-K-1) / 2K -> -K < -1, K > 0 -> (I) & (II) -> K > 0

-> -K < -1, K > 0 -> -K < -1, K > 0 -> K > -1 (III) -> طبق مقادیر صحیح و منطقی

سوال 11

1/2 a = -b / 2a -> a = -a / 2 -> a / 2 = -1 -> a = -2 -> a/b = 2

-c = -1 + 2 - b - 1 -> b = 2

f(1) = 2 -> 1 + a(1) + b(1) + c = 2 -> c = 2

سوال 12

f'(u) = 2u^2 + 2au + b -> f'(1) = 0 -> f'(1) = 2(1)^2 + 2a(1) + b = 0 -> b = -4

f(u) = u^2 + au^2 + 2 -> f'(u) = 2u^2 + 2au = 0 -> u(2u + 2a) = 0 -> u = 0, u = -a

u = -a/2 -> f(-a/2) = 0 -> (a/2)^2 + a(-a/2) + 2 = 0

-> -a^2/4 + a^2/2 + 2 = 0 -> a^2 = -4 -> a = -2

u = -a/2 -> u\_min = -(-2)/2 = 1

f'(u) = 2u^2 - 12u = 0 -> 2u(u - 6) = 0 -> u = 0, u = 6

سوال 13

Table with columns u, -sqrt(3), 0, sqrt(3) and rows y', y. Signs are -, 0, -, 0, +. Arrows indicate min, max, min.

A(-sqrt(3), -f), B(sqrt(3), -f) -> M\_AB = 0

f''(u) = 4u^2 - 12 = 0 -> 4u^2 = 12 -> u = +/- 3 -> نقاط C(1,0), D(-1,0) -> M\_CD = 0

در خط AB و CD موازی اند -> زاویه بین آنها صفر است