

نیایش زیدی به نام خدا / دوازدهم فصل / کلیف شماره ۴

الف) $-2 \leq 3x \leq 4$ $-2 \leq 3x - 2 \leq 2$ $-\frac{2}{3} \leq x \leq \frac{4}{3}$
 $D_f = \left[-\frac{2}{3}, \frac{4}{3}\right]$

ب) $-12 \leq 3x \leq -6$ $-14 \leq 3x - 2 \leq -8$ $-4 \leq x \leq -2$
 $D_f = [-4, -2]$

۲- $f(x) = x + \sqrt{x-2}$ $(x-2) + \sqrt{(x-2)-2} = x-2 + \sqrt{x-4}$

مربع میزنیم: $y = x$ پس تابع را اصلاح میکنیم

$f(x) = x-2 + \sqrt{x-4} \rightarrow y = \left(\sqrt{x-4} + \frac{1}{4}\right)^2 + \frac{y}{4}$

$y - \frac{y}{4} = \left(\sqrt{x-4} + \frac{1}{4}\right)^2$ $\sqrt{y - \frac{y}{4}} - \frac{1}{4} = \sqrt{x-4}$

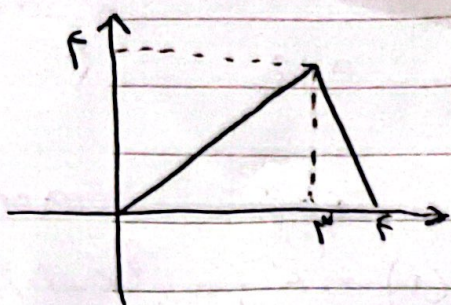
$y - \frac{y}{4} + \frac{1}{4} - \sqrt{y - \frac{y}{4}} = x - 4$ $y - \frac{y}{4} - \sqrt{y - \frac{y}{4}} + \frac{15}{4} = x$

$y - \sqrt{y - \frac{y}{4}} + \frac{15}{4} = x$ $y = x - \sqrt{x - \frac{y}{4}} + \frac{15}{4}$ در اینجا $y = x$ میگذاریم

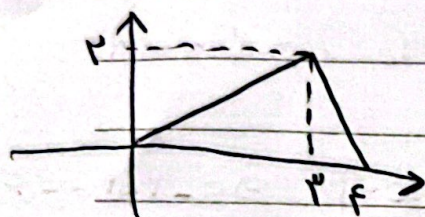
$x - \sqrt{x - \frac{y}{4}} + \frac{15}{4} = x$ $\frac{15}{4} = \sqrt{x - \frac{y}{4}}$ $\frac{100}{16} = x - \frac{y}{4}$

$x = \frac{100}{16} + \frac{y}{4}$ $\frac{128}{16} = \frac{32}{4} = 8$ زیر آن $y = x$ در نقطه $(8, 8)$

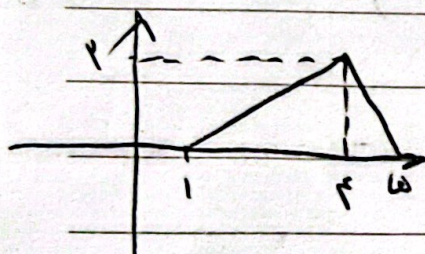
پس با عرض ۸



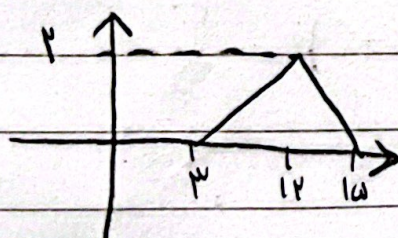
$$g(x) = 2f(3x+1)$$



$$y = f(3x+1)$$



$$y = f(3x)$$



$$y = f(x)$$

$$\Delta S = \frac{12 \times 2}{2} = 12$$

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$$y = f(x)$$

$$y = a + r f\left(\frac{x-a}{r}\right)$$

$$A(r, -r)$$

$$A'(x, rx-1)$$

$$a = r$$

$$-r$$

$$f(r) = -r$$

$$f\left(\frac{x-a}{r}\right) = f(r)$$

$$\frac{x-a}{r} = r \quad x-a = r^2$$

$$a = x - r^2$$

$$A'(x, x - r^2 + rf(r)) = A'(x, rx-1)$$

$$x - r^2 + \underbrace{rf(r)}_{-r} = rx - 1$$

$$x - r^2 + (-r) = rx - 1$$

$$x - 10 = rx - 1$$

$$x = -r$$

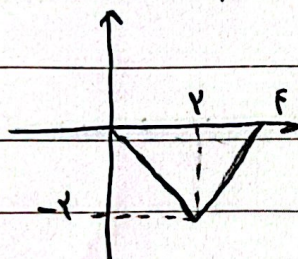
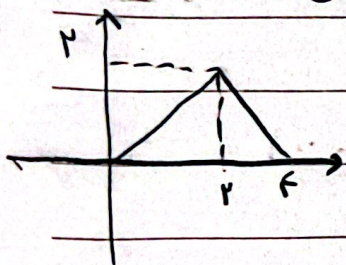
$$a = x - r^2$$

$$a = -r - r^2 = -r$$

$$y = -f(xr)$$

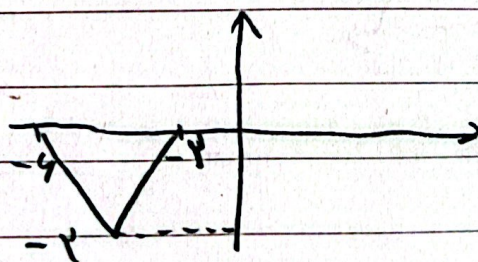
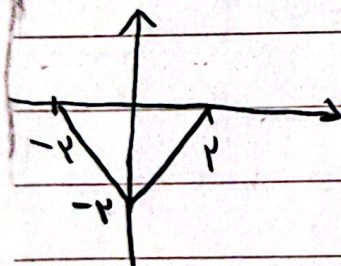
$$y = f(x-r)$$

-d



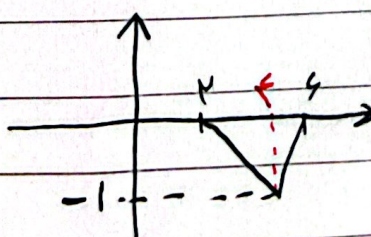
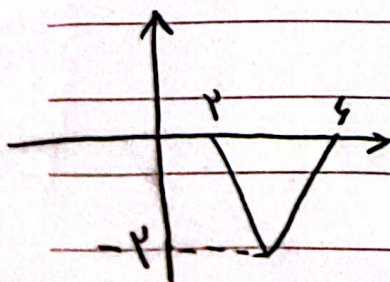
$$y = f(x)$$

$$y = f(x+r)$$



$$y = f(-x+r)$$

$$y = \frac{1}{r} f(r-x)$$



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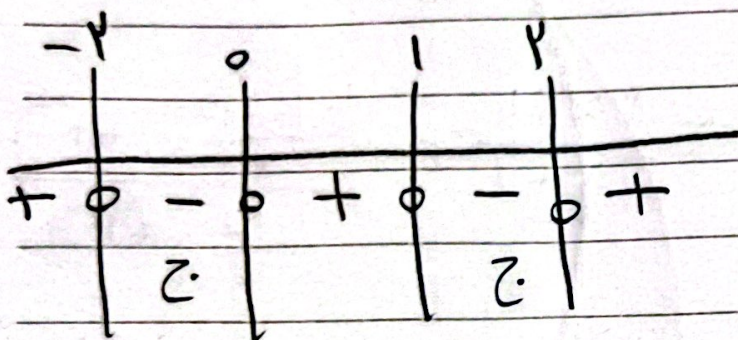
$$y = \sqrt{-(x+2)f(3x-1)} \quad -(x+2)f(3x-1) \geq 0 \quad -4$$

$$(x+2)f(3x-1) \leq 0 \quad f(-1)=0 \quad f(2)=0 \quad f(5)=0$$

نشان ده که $2 < x < 5$

$$3x-1=-1 \quad 3x=0 \quad (x=0) \quad 3x-1=2 \quad 3x=3$$

$$(x=1) \quad 3x-1=5 \quad 3x=6 \quad (x=2)$$



$$D_f = [-2, 0] \cup [1, 2]$$

$$f(x) = |2x-3|+1 \quad g(x) = |2(x+k)-3|+1-3 \quad -7$$

$$g(x) = |2x+2k-3|-2 \quad \text{حل برده} \rightarrow (0, 7)$$

$$f(x) \xrightarrow{x=0} |-3|+1=4 \Rightarrow y=4 \quad \text{حل (4, 0) برده}$$

$$|2x+2k-3|-2 \xrightarrow{x=0} |2k-3|-2=4$$

$$|2k-3|=6 \quad 2k-3=6 \quad 2k=9 \quad k=\frac{9}{2} \quad \checkmark$$

$$2k-3=-6 \quad 2k=-3 \quad k=-\frac{3}{2} \quad \text{غیر قابل قبول}$$

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سوال 1

$$f(x) = \frac{px-1}{x+1} \rightarrow \frac{1-px}{x+1}$$

$$\frac{1-p\left(\frac{1}{p}x\right)}{\frac{1}{p}x+1} + k = \frac{px-1}{x+1}$$

$$\frac{1-\frac{p}{p}x}{\frac{1}{p}x+1} + k = \frac{px-1}{x+1}$$

$$\frac{\frac{1x}{p}}{\frac{x+p}{p}} + k = \frac{px-1}{x+1}$$

$$\frac{x}{x+p} + k = \frac{px-1}{x+1} \quad \frac{x+kx+pk}{x+p} = \frac{px-1}{x+1}$$

$$\frac{(k+1)x + pk}{x+p} = \frac{px-1}{x+1}$$

$$px^p + 5x - x - p = (k+1)x^p + pkx + (k+1)x + p$$

$$px^p + 4x - p = (k+1)x^p + (pk+1)x + p$$

$$(k-1)x^p + (pk-1)x + (pk+p) = 0 \quad \text{سوال 1 جواب}$$

$$b^2 = 4ac \quad \Delta = 0 \quad \text{---}$$

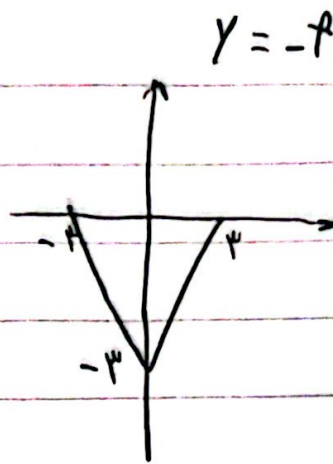
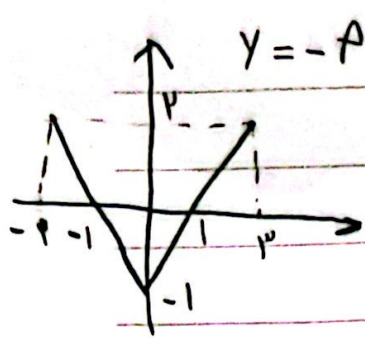
$$(pk-1)^p = 4(k-1)(pk+p) \quad (k-1)^p = 4(k-1)(pk+p)$$

$$pk-1 = 4k+4p$$

$$k = p$$

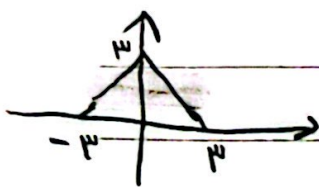
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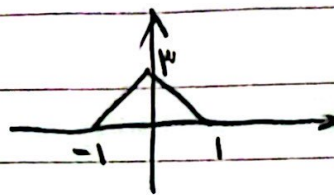


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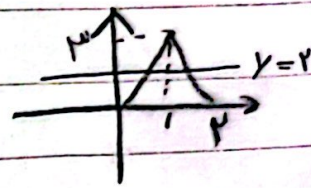
$y = f\left(\frac{x}{p}\right)$



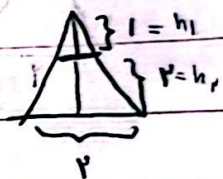
$y = f(x)$



$y = f(n-1)$



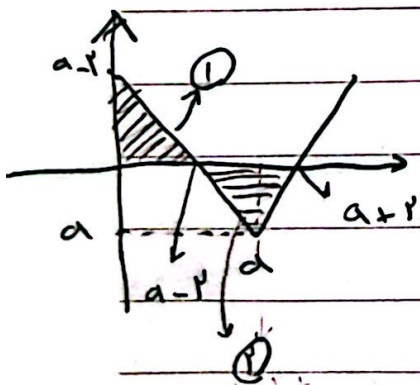
$$\frac{h_1}{h_1 + h_2} = \frac{1}{3} \xrightarrow{\text{مساوی}} \frac{1}{9}$$



پس باید $\frac{1}{9}$ مساحت مثلث بزرگ را حساب کنیم

مساحت بزرگ $S = \frac{2 \times 3}{2} = 3 \times \frac{1}{9} = \frac{1}{3}$

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$$S_1 = \frac{(a-r)(a-r)}{2} = \frac{(a-r)^2}{2}$$

$$S_2 = \frac{(a+r-a-r)(a)}{2} = \frac{0 \cdot a}{2} = 0$$

$$\frac{a-r}{a} = \frac{a-r}{a} \rightarrow a$$

$$\frac{a^2 - 2ar + r^2 + ar}{2} = \frac{a^2}{2} \quad a^2 + r^2 = a^2$$



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$$a = \pm \sqrt{a^2} \rightarrow a = \sqrt{a^2}$$

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$$f(x) = |x - \sqrt{a}| - r \quad f\left(\frac{1}{\sqrt{a}}\right) = 0$$

$$\left| \frac{\sqrt{a}}{a} - \sqrt{a} \right| - r = \sqrt{a} - \frac{\sqrt{a}}{a} - r \quad \boxed{\frac{r\sqrt{a}}{a} - r}$$