

μ, μ

$\mu \rightarrow \mu$

$$\int \frac{x}{x^{\mu} + \epsilon} dx = \frac{\ln(x^{\mu} + \epsilon)}{\mu}$$

$$\frac{x^{\mu}}{x^{\mu} + \epsilon}$$

$\omega \times x^{\omega}$

$$\int \frac{\omega x^{\omega}}{x^{\mu} + \epsilon} dx = \omega \ln(x^{\mu} + \epsilon)$$

$$\frac{x^{\omega}}{x^{\mu} + \epsilon}$$

$\mu \times y^{\omega}$

$$\int \frac{\mu x^{\omega}}{x^{\mu} + 1} dx = \mu \ln(x^{\mu} + 1)$$

$$\frac{y x^{\omega}}{x^{\mu} + 1}$$

$$\int \frac{x^{\mu}}{x^{\nu} - \omega} dx = \frac{\ln(x^{\nu} - \omega)}{\nu}$$

$$\frac{\nu x^{\mu}}{x^{\nu} - \omega}$$

$$\int \frac{\log a^x}{a^x - 1} dx = \frac{1}{a} \ln(a^x - 1)$$

(Note: A red arrow points from the 'x' in the denominator to the 'x' in the numerator's log argument.)

$$\int \frac{a^x + 4}{a^x} dx = \int \frac{a^x}{a^x} dx + \int \frac{4}{a^x} dx$$

$$\int a^x dx + 4 \int a^{-x} dx = \frac{a^x}{1} + 4 \frac{a^{-x+1}}{-x+1}$$

$$\int a \cos a x - k a x dx$$

$$= \int a \cos a x dx - \int k a x dx$$

(Note: Red arrows point to the 'a' and 'a' in the first term, and a pink arrow points to the 'k' in the second term.)

$$= a \sin a x + \cos a x - k \frac{a x^2}{2}$$

$$\frac{d a^x}{a^x - 1}$$

(Note: A red arrow points from the 'x' in the denominator to the 'x' in the numerator's derivative.)

البرهان
صحيح

+	a		cos ax
-	1		sin ax
+	0		- cos ax

تمرین شماره یک

① دامنه توابع زیر را بنویسید

① $f(x) = \frac{x+2}{x-5}$

$$x-5=0$$

$$\Rightarrow x=5$$

$$D_f = \mathbb{R} - \{5\}$$

② $f(x) = 2x^2 + 4$

$$D_f = \mathbb{R}$$

③ $f(x) = \frac{x}{x+1}$

نوشتار

$$D_f = \mathbb{R}$$

④ $f(x) = \frac{11x+5}{x^2-14}$

$$x^2-14=0$$

$$x^2=14 \Rightarrow x = \pm\sqrt{14} = \pm\sqrt{2}$$

$$D_f = \mathbb{R} - \{\pm\sqrt{2}\}$$

$$x = \pm\sqrt{2}$$

② $f(x) = x$

$D_f = \mathbb{R}$

④ $f(x) = \frac{0}{x-9}$

$x-9=0$

$x=9 \Rightarrow x = \frac{0}{x} = 0$

$D_f = \mathbb{R} - \{9\}$

⑤ $f(x) = \frac{x}{x^2 - 2}$

$x^2 - 2 = 0$

$\Rightarrow x = \pm \sqrt{2}$

$\Rightarrow x = \pm \sqrt{2}$

$D_f = \mathbb{R} - \{\pm \sqrt{2}\}$

⑦ $f(x) = \frac{x}{x^2 - x}$

$x^2 - x = 0$

$x(x-1) = 0$

$\Rightarrow \begin{cases} x = 0 \\ x^2 - 1 = 0 \Rightarrow x = \pm 1 \end{cases}$

$D_f = \mathbb{R} - \{0, \pm 1\}$

$\Rightarrow x = \pm 1$

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$$f(x) = \sqrt{x-9}$$

$$x-9 > 0 \Rightarrow x > 9$$

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$$f(x) = \frac{19x^2 - 1}{2x^2 - 12x}$$

$$19x^2 - 1 = 0$$

$$x(19x - 1) = 0$$

$$\Rightarrow \begin{cases} x = 0 \\ 19x - 1 = 0 \Rightarrow 19x = 1 \end{cases}$$

$$D_f = \mathbb{R} - \left\{ 0, \frac{1}{19} \right\}$$

$$x = \frac{1}{19} = \frac{1}{19}$$

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$$f(x) = \sqrt{\frac{x}{x+1}}$$

$$x+1 = 0$$

$$x = -1$$

$$D_f = \mathbb{R} - \{-1\}$$

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$$f(x) = \frac{7x}{19x^2 + 1}$$

$$19x^2 + 1 = 0$$

$$19x^2 = -1 \Rightarrow x^2 = -\frac{1}{19}$$

$$D_f = \mathbb{R}$$



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

$$x^2 + 1 > 0 \Rightarrow x^2 > -1$$

14

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

$$x^2 + 1 = 0$$

$$x^2 = -1$$

$$x = \pm \frac{1}{i}$$

$$D_f = \mathbb{R} - \left\{ -\frac{1}{i} \right\}$$

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$$f(x) = \frac{x^2}{x^2 - 1}$$

$$D_f = \mathbb{R}$$

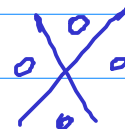
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$$f(x) = \frac{x^2}{x^2 + 9}$$

$$x^2 + 9 = 0$$

$$\Rightarrow x^2 = -9$$

$$D_f = \mathbb{R}$$



$g(x) = \omega x$, $f(x) = \frac{x}{x+1}$ آر (5)
 • ... , $f \circ g(0)$

$$f \circ g(x) = \frac{g(x)}{g(x)+1} = \frac{\omega x}{\omega x + 1}$$

$$f \circ g(0) = \frac{0}{0+1} = \frac{0}{1} = 0$$

$g(x) = \frac{x}{2}$, $f(x) = x$ آر (4)
 • ... , $f \circ g(4)$ مبداء

$$f \circ g(x) = g(x) = \frac{x}{2}$$

$$f \circ g(4) = \frac{4}{2} = 2$$

$g(x) = (11x^2 - 4)$, $f(x) = \frac{\omega x - 2}{2}$ آر (3)

• ... , $f \circ g(-1)$ آنگاه

$$f \circ g(x) = \frac{\omega g(x) - 2}{2} = \frac{\omega(11x^2 - 4) - 2}{2}$$

$$f \circ g(-1) = \frac{(\omega)(4) - 2}{2} = \frac{11}{2} = 5.5$$

معلوں توابع زیر اسباب

$$y = \sqrt{x-9}$$

$$x = \sqrt{y-9} \Rightarrow x^2 = y-9 \Rightarrow y = x^2 + 9$$

$f(x)$

$$y = 9x + 1$$

$$x = 9y + 1 \Rightarrow 9y = x - 1 \Rightarrow y = \frac{x-1}{9}$$

$f(x)$

$$y = 2x - 3$$

$$x = 2y - 3 \Rightarrow 2y = x + 3 \Rightarrow y = \frac{x+3}{2}$$

$f(x)$

$$y = \sqrt{x+v}$$

$$x = \sqrt{cy+v} \Rightarrow x^2 = cy+v \Rightarrow cy = x^2 - v$$

$$\Rightarrow f(x) = y = \frac{x^2 - v}{c}$$

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

$$x = \frac{x^2}{2} - 1 \Rightarrow \frac{x^2}{2} = x + 1 \Rightarrow \frac{x^2}{2} = x + 1$$

$$f(x) = \sqrt{\frac{x^2}{2}}$$

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

$$x = \frac{x^2}{2} - 1 \Rightarrow \frac{x^2}{2} = x + 1 \Rightarrow \frac{x^2}{2} = x + 1$$

$$f(x) = \sqrt{\frac{x^2}{2}}$$

$$y = \sqrt{x^2 - 2}$$

$$x = \sqrt{x^2 - 2} \Rightarrow \sqrt{x^2 - 2} = x$$

$$\sqrt{x^2 - 2} = x$$

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