باران حیرت دولابی - تکلیف شماره ۳۰ - یازدهم دختر C

-۱

ریشه‌ها $\Rightarrow \frac{3}{4}$ ، 1

$$\frac{4x^2-7x+3}{5x^2-8x+3}=\frac{4(x-\frac{3}{4})(x-1)}{5(x-\frac{3}{5})(x-1)}\xrightarrow{x=1}\frac{4\times\frac{1}{4}}{5\times\frac{2}{5}}=\frac{1}{2}$$

ریشه‌ها $\frac{3}{5}$ ، 1

-۲

$$0^+ \to \frac{(3x-1)-(3x+1)}{0^+}=\frac{-2}{0^+}=-\infty$$

$$0^- \to \frac{(-3x+1)-(3x+1)}{0^-}=\frac{6}{0^-}=-\infty$$

-۳

$$\frac{x-4}{\sqrt{x}-2}\times\frac{\sqrt{x}+2}{\sqrt{x}+2}=\frac{(x-4)(\sqrt{x}+2)}{(x-4)}=\sqrt{x}+2\xrightarrow{x\to 4}4$$

-۴

$$\frac{x-\sqrt{2x}}{2x^2-x-6}=\frac{x-\sqrt{2x}}{2(x-2)(x+\frac{3}{2})}\times\frac{x+\sqrt{2x}}{x+\sqrt{2x}}=\frac{\overbrace{x^2-2x}^{x(x-2)}}{2(x-2)(x+\frac{3}{2})}\times\frac{1}{4}=\frac{1}{14}$$

روش ک $x^2-x-12=0$

$(x-4)(x+3)=0 \quad \frac{4}{2}=2 \,,\; \frac{-3}{2}$

-۵

$$\frac{1-\sqrt{x}}{2-\sqrt{5-x}}\times\frac{1+\sqrt{x}}{1+\sqrt{x}}\times\frac{2+\sqrt{5-x}}{2+\sqrt{5-x}}=\frac{1-x}{\underbrace{-1+x}_{-(1-x)}}\times\frac{4}{2}=-2$$

-۶

$$\frac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3}\times\frac{\sqrt{3x+4}+4}{\sqrt{3x+4}+4}\times\frac{\sqrt[3]{(5x+7)^2}+3\sqrt[3]{5x+7}+9}{\sqrt[3]{(5x+7)^2}+3\sqrt[3]{5x+7}+9}=\frac{\overbrace{3x-12}^{3(x-4)}}{\underbrace{5x-20}_{5(x-4)}}\times\frac{27}{8}=\frac{81}{40}$$

-۷

$$\frac{\sqrt{3x+\sqrt{x}}-2}{\sqrt[3]{x}-1}\times\frac{\sqrt[3]{x^2}+\sqrt[3]{x}+1}{\sqrt[3]{x^2}+\sqrt[3]{x}+1}\times\frac{\sqrt{3x+\sqrt{x}}+2}{\sqrt{3x+\sqrt{x}}+2}=\frac{3x+\sqrt{x}-4}{x-1}\times\frac{3}{4}=$$

$$\frac{3(x-1)(x+\frac{4}{3})}{(\sqrt{x}-1)(\sqrt{x}+1)}\times\frac{3}{4}=\frac{21}{8}$$

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$$\frac{(1+\cos x)(1-\cos x+\cos^2 x)}{\underbrace{1-\cos^2 x}_{(1-\cos x)(1+\cos x)}}=\frac{2+1}{2}=\frac{3}{2}$$

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$$\frac{\frac{\cos x-\sin x}{\cos x}}{\sin x-\cos x}=\frac{-1}{\cos x}=-\frac{2}{\sqrt{2}}=-\sqrt{2}$$

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باران میرث دولاتی - تکلیف شماره ۳۰ - یازدهم دختر

۱-

$$\frac{4x^2-7x+3}{5x^2-8x+3}=\frac{4(x-\frac{3}{4})\cancel{(x-1)}}{5(x-\frac{3}{5})\cancel{(x-1)}}\xrightarrow{x=1}\frac{4\times\frac{1}{4}}{5\times\frac{2}{5}}=\frac{1}{2}$$

ریشه ها $\Rightarrow \frac{3}{4}, 1$

ریشه ها $\frac{3}{5}, 1$

۲-

$$0^+:\quad \frac{(3x-1)-(3x+1)}{0^+}=\frac{-2}{0^+}=-\infty$$

$$0^-:\quad \frac{(-3x+1)-(3x+1)}{0^-}=\frac{6}{0^-}=-\infty$$

۳-

$$\frac{x-4}{\sqrt{x}-2}\times\frac{\sqrt{x}+2}{\sqrt{x}+2}=\frac{\cancel{(x-4)}(\sqrt{x}+2)}{\cancel{(x-4)}}=\sqrt{x}+2\xrightarrow{x\to4}4$$

۴-

$$\frac{x-\sqrt{2x}}{2x^2-x-6}=\frac{x-\sqrt{2x}}{2(x-2)(x+\frac{3}{2})}\times\frac{x+\sqrt{2x}}{x+\sqrt{2x}}=\frac{\overbrace{x^2-2x}^{x(x-2)}}{2\cancel{(x-2)}(x+\frac{3}{2})}\times\frac{1}{4}=\frac{1}{14}$$

روش $\hookrightarrow x^2-x-12=0$

$(x-4)(x+3)=0 \quad \frac{4}{2}=2,\ -\frac{3}{2}$

۵-

$$\frac{1-\sqrt{x}}{2-\sqrt{5-x}}\times\frac{1+\sqrt{x}}{1+\sqrt{x}}\times\frac{2+\sqrt{5-x}}{2+\sqrt{5-x}}=\frac{1-x}{\underbrace{-1+x}_{-(1-x)}}\times\frac{4}{2}=-2$$

۶-

$$\frac{\sqrt{3x+4}-4}{\sqrt[3]{5x+7}-3}\times\frac{\sqrt{3x+4}+4}{\sqrt{3x+4}+4}\times\frac{\sqrt[3]{(5x+7)^2}+3\sqrt[3]{5x+7}+9}{\sqrt[3]{(5x+7)^2}+3\sqrt[3]{5x+7}+9}=\frac{\overbrace{3x-12}^{3\cancel{(x-4)}}}{\underbrace{5x-20}_{5\cancel{(x-4)}}}\times\frac{27}{8}=\frac{81}{40}$$

۷-

$$\frac{\sqrt{3x+\sqrt{x}}-2}{\sqrt[3]{x}-1}\times\frac{\sqrt[3]{x^2}+\sqrt[3]{x}+1}{\sqrt[3]{x^2}+\sqrt[3]{x}+1}\times\frac{\sqrt{3x+\sqrt{x}}+2}{\sqrt{3x+\sqrt{x}}+2}=\frac{3x+\sqrt{x}-4}{x-1}\times\frac{3}{4}=$$

$$\frac{3\cancel{(x-1)}(x+\frac{4}{3})}{\cancel{(\sqrt{x}-1)(\sqrt{x}+1)}}\times\frac{3}{4}=\frac{21}{8}$$

۸-

$$\frac{\cancel{(1+\cos x)}(1-\cos x+\cos^2 x)}{\underbrace{1-\cos^2 x}_{(1-\cos x)\cancel{(1+\cos x)}}}=\frac{2+1}{2}=\frac{3}{2}$$

۹-

$$\frac{\frac{\cos x-\sin x}{\cos x}}{\sin x-\cos x}=\frac{-1}{\cos x}=-\frac{2}{\sqrt{2}}=-\sqrt{2}$$

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$$\tan^2 x - 1 = \left(\frac{\sin x}{\cos x} - 1\right)\left(\frac{\sin x}{\cos x} + 1\right) = \frac{(\sin x - \cos x)(\sin x + \cos x)}{\cos^2 x}$$

$$\cos 2x = \cos^2 x - \sin^2 x = \underbrace{(\cos x - \sin x)}_{-(\sin x - \cos x)}(\sin x + \cos x)$$

$$\Rightarrow \frac{\dfrac{\cancel{(\sin x - \cos x)}\,\cancel{(\sin x + \cos x)}}{\cos^2 x}}{-\cancel{(\sin x - \cos x)}\,\cancel{(\sin x + \cos x)}} =$$

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