

$$*(3x + \frac{1}{2})(3x - \frac{1}{2})$$

$$(3x + \frac{1}{2})(3x - \frac{1}{2})$$

$$9x^2 - \frac{3}{2}x + \frac{3}{2}x - \frac{1}{4}$$

$$\boxed{9x^2 - \frac{1}{4}}$$

$$* \frac{1}{10-x} + \frac{x-1}{x-10}$$

$$\frac{1}{10-x} + \frac{x-1}{x-10}$$

$$\frac{1}{-(x-10)} + \frac{x-1}{x-10} = \frac{(x-10) + -(x-1)}{-(x-10)}$$

$$\frac{x-10-x+1}{-(x-10)} = \frac{-9}{-(x-10)} = \boxed{\frac{9}{x-10}}$$

$$*\sqrt[3]{2} * \sqrt{7}$$

$$\sqrt[3]{2} \cdot \sqrt{7}$$

$$2^{1/3} \cdot 7^{1/2} = 2^{2/6} \cdot 7^{3/6}$$

$$= \sqrt[6]{2^2 \cdot 7^3}$$

$$= \boxed{\sqrt[6]{1372}}$$

$$\frac{\sqrt{2}-\sqrt{3}}{\sqrt{2}+\sqrt{3}}$$

$$\frac{(\sqrt{2}-\sqrt{3})(\sqrt{2}-\sqrt{3})}{(\sqrt{2}+\sqrt{3})(\sqrt{2}-\sqrt{3})}$$

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

$$\boxed{-1+2\sqrt{6}}$$

$$\frac{(4x^4 - 3x^3 - x - 1)}{(x+3)}$$

$$\begin{array}{r|rrrrr} -3 & 4 & -3 & 0 & -1 & -1 \\ & & -12 & 45 & -135 & 408 \\ \hline & 4 & -15 & 45 & -136 & 407 \end{array}$$

$$4x^3 - 15x^2 + 45x - 136 + \frac{407}{x+3}$$

$$* \frac{5x-10}{3-x} * \frac{x+2}{10x+20} * \frac{x^2-9}{x^2-x-6}$$

$$\frac{5(x-2)}{-(x-3)} \cdot \frac{x+2}{\frac{10(x+2)}{2}} \cdot \frac{(x-3)(x+3)}{(x-3)(x+2)}$$

$$\frac{-(x-2)(x+3)}{2(x-3)(x+2)}$$