

(1)[4 points] Solve for  $x$ :

$$3x^2 + 5x + 1 = 0$$

$$a=3, b=5, c=1$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

$$= \frac{-5 \pm \sqrt{25 - 4(3)(1)}}{2(3)}$$

$$= \frac{-5 \pm \sqrt{13}}{6}$$

$$\therefore x = \frac{-5 + \sqrt{13}}{6}, \frac{-5 - \sqrt{13}}{6}$$

(2)[3 points] Simplify using the exponent laws:

$$\sqrt[4]{\frac{t^{1/2}\sqrt{st}}{s^{2/3}}}$$

$$= \left[ \frac{t^{1/2} (st)^{1/2}}{s^{2/3}} \right]^{1/4}$$

$$= \left[ \frac{t^{1/2} s^{1/2} t^{1/2}}{s^{2/3}} \right]^{1/4}$$

$$= \left[ t^{1/2+1/2} s^{1/2-2/3} \right]^{1/4}$$

$$= \left[ t s^{-1/6} \right]^{1/4}$$

$$= \frac{t^{1/4}}{s^{1/24}}$$

(3)[4 points] Rationalize the numerator and simplify:

$$\begin{aligned} & \frac{\sqrt{x}-3}{x-9} \\ &= \frac{\sqrt{x}-3}{x-9} \left( \frac{\sqrt{x}+3}{\sqrt{x}+3} \right) \\ &= \frac{\cancel{(x-9)}}{\cancel{(x-9)}(\sqrt{x}+3)} \\ &= \frac{1}{\sqrt{x}+3} \end{aligned}$$

(4)[4 points] Solve for  $x$

$$x^2 + 9x - 10 = 0$$

$$(x+10)(x-1) = 0$$

$$x+10 = 0 \quad , \quad x-1 = 0$$

$$x = -10 \quad , \quad x = 1$$