

8.5- Homework Answers

Pg. 517-518 #22-34 even, 45, 46-56 even

$$22. \frac{1}{1+c} - \frac{1}{2+c} = \frac{1}{4}$$

$$\frac{2+c}{2+c} \cdot \frac{1}{1+c} + \frac{-1}{2+c} \cdot \frac{1+c}{1+c} = \frac{1}{4}$$

$$\frac{2+c-1-c}{c^2+3c+2} = \frac{1}{4}$$

$$\frac{1}{c^2+3c+2} = \frac{1}{4}$$

$$c^2+3c+2=4$$

$$\frac{-4 \quad -4}{c^2+3c-2=0}$$

$$a=1$$

$$b=3$$

$$c=-2$$

$$x = \frac{-3 \pm \sqrt{3^2 - 4(1)(-2)}}{2(1)} = \frac{-3 \pm \sqrt{17}}{2}$$

$$24. \frac{x-4}{x+2} + \frac{2}{x-2} = \frac{17}{x^2-4}$$

$$\frac{x-2}{x-2} \cdot \frac{x-4}{x+2} + \frac{2}{x-2} \cdot \frac{x+2}{x+2} = \frac{17}{(x+2)(x-2)}$$

$$x^2 - 6x + 8 + 2x + 4 = 17$$

$-17 \quad -17$

$$x^2 - 4x - 5 = 0$$

$$(x-5)(x+1) = 0$$

$$x = 5, -1$$

$$26. \frac{3z}{z-1} + \frac{2z}{z-6} = \frac{5z^2 - 15z + 20}{z^2 - 7z + 6}$$

$$\frac{z-6}{z-6} \cdot \frac{3z}{z-1} + \frac{2z}{z-6} \cdot \frac{z-1}{z-1} = \frac{5z^2 - 15z + 20}{(z-6)(z-1)}$$

$$3z^2 - 18z + 2z^2 - 2z = 5z^2 - 15z + 20$$

$$5z^2 - 20z = 5z^2 - 15z + 20$$

$$\begin{array}{r} -5z^2 + 15z \\ \hline -5z = 20 \end{array}$$

$$\begin{array}{r} -5z = 20 \\ \hline -5 \quad -5 \\ \hline \end{array}$$

$$z = -4$$

$$28. \frac{x+2}{2x-3} - \frac{x-2}{2x+3} = \frac{21}{4x^2-9}$$

$$\frac{2x+3}{2x+3} \cdot \frac{x+2}{2x-3} + \frac{-x+2}{2x+3} \cdot \frac{2x-3}{2x-3} = \frac{21}{(2x+3)(2x-3)}$$

$$\underline{2x^2 + 7x + 6 - 2x^2 + 7x - 6 = 21}$$

$$14x - 21 = 0$$

$$\underline{\quad + 21 \quad + 21}$$

$$\frac{14x}{14} = \frac{21}{14}$$

$$x = \cancel{\frac{3}{2}}$$

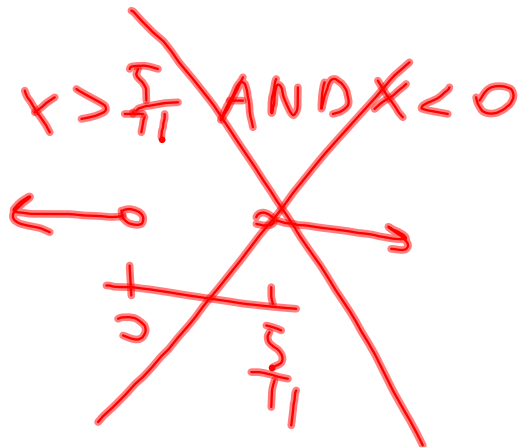
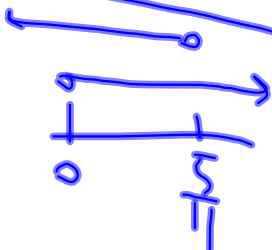
No Solution

$$30. \frac{x+5}{4x} > 3$$

$$\frac{x+5}{4x} > 12x \text{ where } \frac{4x > 0}{x > 0} \quad \text{OR} \quad x+5 < 12x \text{ where } \frac{4x < 0}{x < 0}$$

$$\frac{5}{4} > \frac{11x}{4}$$

$$x < \frac{5}{11} \text{ AND } x > 0$$



$$32. \frac{x-5}{3x} < \frac{3}{1}$$

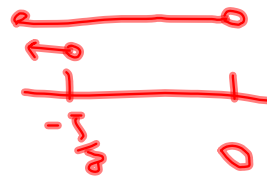
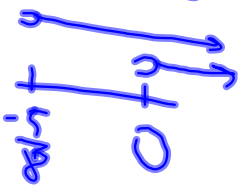
$$\frac{x-5}{-x} < \frac{9x}{-x} \quad \text{AND} \quad \frac{3x}{3} > \frac{0}{3} \quad \text{OR} \quad x-5 > 9x \quad \text{AND} \quad 3x < 0$$

$$\frac{-5 < 8x}{8}$$

$$x > 0$$

$$x < -\frac{5}{8} \quad \text{AND} \quad x < 0$$

$$x > -\frac{5}{8} \quad \text{AND} \quad \underline{x > 0}$$



$$x > 0 \quad \text{OR} \quad x < -\frac{5}{8}$$

$$34. 3 < \frac{3x+4}{2+1}$$

$$3 \left[3 < \frac{3x+4}{3} \right]$$

$$\begin{array}{r} 9 < 3x+4 \\ \underline{-4} \quad \underline{-4} \end{array}$$

$$\begin{array}{r} 5 < 3x \\ \underline{\quad} \quad \underline{\quad} \end{array}$$

$$x > \frac{5}{3}$$

$$34. \frac{3}{1} < \frac{3x+4}{2x+1}$$

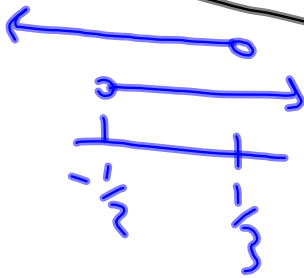
$$6x+3 < 3x+4 \text{ AND } 2x+1 > 0 \text{ OR } 6x+3 > 3x+4 \text{ AND } 2x+1 < 0$$

$$\frac{6x+3}{-3x} < \frac{3x+4}{-3x}$$

$$\frac{3x+3 < 4}{-3 \quad -3}$$

$$\frac{3x < 1}{3 \quad 3}$$

$$x < \frac{1}{3} \text{ AND } x > -\frac{1}{2}$$



$$\frac{2x > -1}{2 \quad 2}$$

$$x > -\frac{1}{2}$$



$$45. \frac{a-3}{3a} \geq \frac{1}{3a^2+9a} + \frac{1}{a+3}$$

$$\frac{a-3}{3a} - \frac{1}{3a^2+9a} - \frac{1}{a+3} \geq 0$$

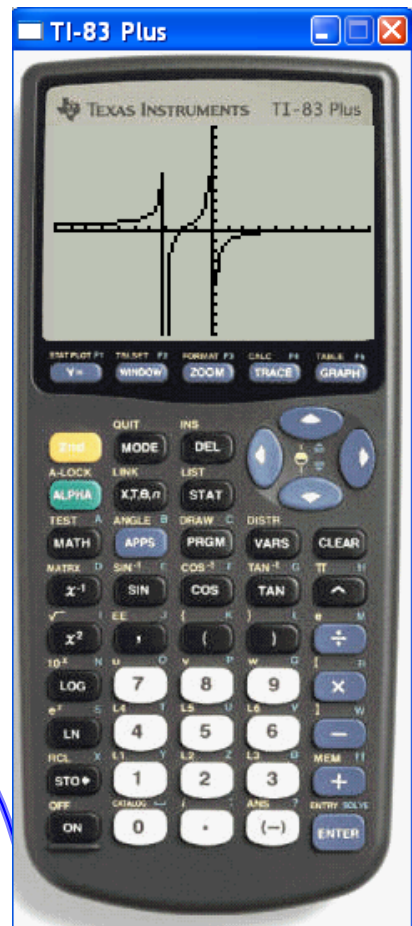
$$\frac{a+3}{a+3} \cdot \frac{a-3}{3a} - \frac{1}{3a(a+3)} - \frac{1}{a+3} \cdot \frac{3a}{3a} \geq 0$$

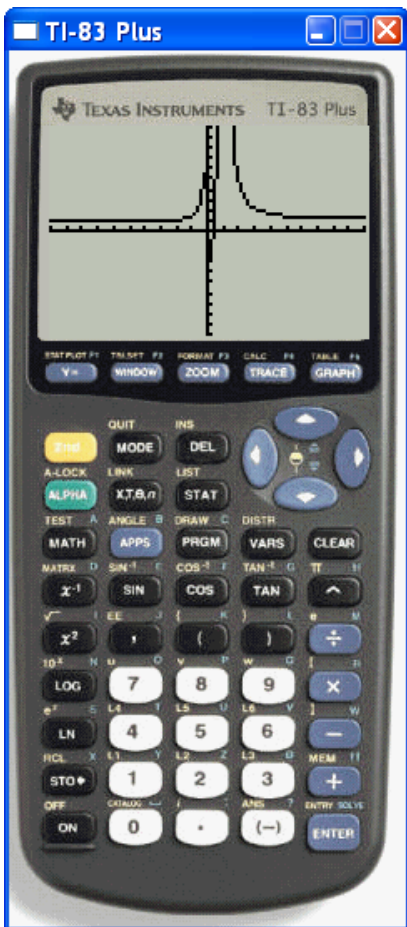
$$\frac{a^2-9-1-3a}{3a(a+3)} \geq 0$$

$$\frac{a^2-3a-10}{3a(a+3)} \geq 0$$

$$\frac{(a-5)(a+2)}{3a(a+3)} \geq 0$$

$$\begin{aligned} & x < -3 \\ & \text{OR} \\ & -2 \leq x < 0 \\ & \text{OR} \\ & x \geq 5 \end{aligned}$$





$$46. \frac{x^2 + 1}{(x-1)^2} > \frac{1}{x}$$

$$\frac{x}{x} \cdot \frac{x^2 + 1}{(x-1)^2} + \frac{-1}{x} \cdot \frac{(x-1)^2}{(x-1)^2} > 0$$

$$\frac{x^3 + x - x^2 + 2x - 1}{x(x-1)^2} > 0$$

$$\frac{x^3 - x^2 + 3x - 1}{x(x-1)^2} > 0$$

$$\begin{aligned} &x < 0 \text{ or } x > 1 \\ &.4 < x < 1 \end{aligned}$$

$$48. \frac{1 - 5x^{-1} + 4x^{-2}}{1 - 16x^{-2}} = \frac{x-1}{x+4}, x \neq 0 \text{ or } x \neq \pm 4$$

$$\frac{1 - \frac{5}{x} + \frac{4}{x^2}}{1 - \frac{16}{x^2}} = \frac{x-1}{x+4}$$

$$\frac{\frac{x^2}{x^2} - \frac{5x}{x^2} + \frac{4}{x^2}}{\frac{x^2}{x^2} - \frac{16}{x^2}} = \frac{x^2 - 5x + 4}{x^2 - 16} \cdot \frac{x^2}{x^2} = \frac{x-1}{x+4}$$

$$\frac{\cancel{(x-4)}(x-1)}{(x+4)\cancel{(x+4)}} = \frac{x-1}{x+4}$$

Always

$$50. \frac{2x+3}{x-1} - \frac{2x-3}{x+1} = \frac{10}{x^2-1}$$

$$\frac{x+1}{x+1} \cdot \frac{2x+3}{x-1} + \frac{-2x+3}{x+1} \cdot \frac{x-1}{x-1} = \frac{10}{(x+1)(x-1)}$$

$$2x^2 + 5x + 3 - 2x^2 + 5x - 3 = 10$$

$$\frac{10x}{10} = \frac{10}{10}$$

$$\cancel{x=1}$$

Never

$$52. \frac{x-6}{x^2-2x-8} + \frac{3}{x-4} \leq \frac{2}{x+2}$$

$$\frac{x-6}{(x-4)(x+2)} + \frac{3}{x-4} \cdot \frac{x+2}{x+2} \leq \frac{2}{x+2} \cdot \frac{x-4}{x-4}$$

$$\frac{x-6+3x+6}{(x-4)(x+2)} \leq \frac{2x-8}{(x-4)(x+2)}$$

$$\frac{4x \leq 2x-8}{-2x \quad -2x}$$

$$\frac{2x \leq -8}{2} \quad \frac{-8}{2}$$
$$x \leq -4$$

Sometimes

$$54) \quad \frac{x}{\frac{1}{2}} + \frac{x}{\frac{1}{3}} + \frac{x}{\frac{1}{4}} + \frac{x}{\frac{1}{5}} = 1$$

$$2x + 3x + 4x + 5x = 1$$

$$\frac{14x = 1}{14 \quad 14}$$

$$x = \frac{1}{14} \text{ day}$$

$$\frac{1}{7}, \frac{3}{14}, \frac{2}{7}, \frac{5}{14}$$

$$56) \quad T(s) = \frac{6}{s} + \frac{15}{9s} + \frac{8}{s+6}$$

$$1.5 = \frac{9}{9} \cdot \frac{6}{s} + \frac{15}{9s} + \frac{8}{s+6}$$

$$1.5 = \frac{(s+6) \cdot 20.4}{(s+6) \cdot 9s} + \frac{9s}{9s} \cdot \frac{8}{s+6}$$

$$1.5 = \frac{20.4s + 122.4 + 72s}{9s^2 + 54s}$$

$$13.5s^2 + 81s = 92.4s + 122.4$$

$$- 92.4s - 92.4s - 122.4$$

$$- 122.4$$

$$13.5s^2 - 11.4s - 122.4 = 0$$

$$a = 13.5$$

$$b = -11.4$$

$$c = -122.4$$

$$s = \frac{11.4 + \sqrt{(-11.4)^2 - 4(13.5)(-122.4)}}{2(13.5)}$$

$$s = 3.5$$

$$s_{\text{swim}} = 3.5 \text{ MPH}$$

$$\text{Bike} = 31.5 \text{ MPH}$$

$$\text{Run} = 9.5 \text{ MPH}$$