① $2x - 5\sqrt{x} + 2 = 0$

larger is ____.

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

and the larger is ____.

$\frac{1}{x-1} - \frac{x}{x+1} - 2 = 0$

larger is ____.

① $2x - 5\sqrt{x} + 2 = 0$

if you square now you get:

$(2x - 5\sqrt{x} + 2)^2 = 0^2 = 0$

$((2x - 5\sqrt{x}) + 2)^2$

$(2x - 5\sqrt{x})^2 + 2 \cdot (2x - 5\sqrt{x})2 + 4$

$4x^2 - 20x\sqrt{x} + 25x$

... instead get radical isolated

Quadratic Eqn

$ax^2 + bx + c = 0$

① $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

② Factoring:

$(x - A)(x - B) = 0$

get $x = B$

$x = B$

$-5\sqrt{x} = -2 - 2x$ now square both sides

$(-5\sqrt{x})^2 = (-2 - 2x)^2$

$(-5)^2(\sqrt{x})^2 = 4 + 8x + 4x^2$

$25x = 4 + 8x + 4x^2$

$0 = 4x^2 - 17x + 4 = 4x^2 - 16x - x + 4$

$= 4x(x - 4) - (x - 4) = (4x - 1)(x - 4)$

$4x - 1 = 0$ or $x - 4 = 0$

$x = 1/4$ or $x = 4$

② $2x^4 - 5x^2 + 2 = 0$

set $w = x^2$

so $w^2 = x^4$

sub

$2w^2 - 5w + 2 = 0$

$2w^2 - 4w - w + 2 = 0$

$2w(w - 2) - 1(w - 2) = 0$

$(2w - 1)(w - 2) = 0$

$w = \frac{1}{2}$ $w = 2$

Recognize Quadratic Type

$aw^2 + bw + c = 0$

back sub

$w = x^2$

$\frac{1}{2}$

solve $x^2 = 1/2$

$x = \pm \frac{1}{\sqrt{2}}$

$x = \sqrt{\frac{1}{2}} = \frac{\sqrt{1}}{\sqrt{2}} = \frac{1}{\sqrt{2}}$

so $x = \frac{1}{\sqrt{2}} \cdot \frac{\sqrt{2}}{\sqrt{2}} = \frac{\sqrt{2}}{2}$

$w = x^2$

2

$x = \pm\sqrt{2}$

(3)

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

(a) CLEAR DENOMINATORS

$$(x-1)\cdot(x+1)\left[\frac{1}{x-1} - \frac{x}{x+1}\right] = (x-1)(x+1)\cdot 2$$

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

$$x+1 - x(x-1) = 2(x^2-1)$$

$$x+1 - x^2 + x = 2x^2 - 2$$

$$0 = 3x^2 - 2x - 3$$

stuck?

$$x = \frac{-(-2) \pm \sqrt{4 - 4\cdot 3(-3)}}{6} = \frac{2 \pm \sqrt{40}}{6} = \frac{2 \pm \sqrt{4\cdot 10}}{6} = \frac{2 \pm 2\sqrt{10}}{6}$$

$$x = 1 \pm \frac{\sqrt{10}}{3}$$

Lines

Main Formulas

$y = mx + b$

$y - y_1 = m(x - x_1)$

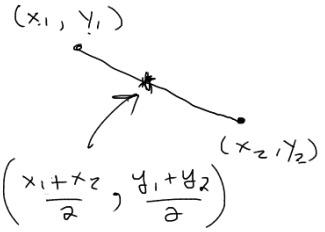
slope $m = \dfrac{y - y_1}{x - x_1}$

Notions

parallel $\Rightarrow$ same slope

perpendicular $\Rightarrow$ negative reciprocal slope

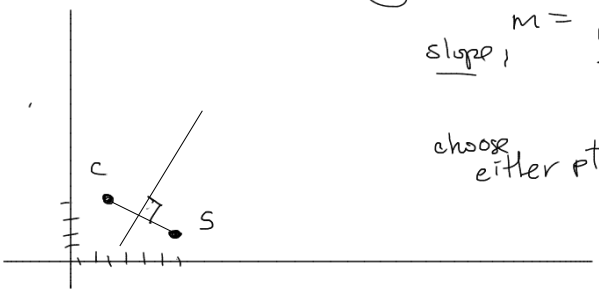
Midpoint Formula



Q: Find an equation of the line that is the perpendicular bisector of the segment joining $(3,4)$ & $(7,2)$

① Find Eqn of line bw $(3,4)$ & $(7,2)$

slope: $m = \dfrac{2-4}{7-3} = \dfrac{-2}{4} = \dfrac{-1}{2}$



choose either pt: $y - 2 = -\frac{1}{2}(x-7) \rightsquigarrow y = -\frac{1}{2}x + \frac{7}{2} + 2$

$y = -\frac{1}{2}x + \frac{11}{2}$

$y - 4 = -\frac{1}{2}(x-3) \rightsquigarrow y = -\frac{1}{2}x + \frac{3}{2} + 4$

$y = -\frac{1}{2}x + \frac{11}{2}$

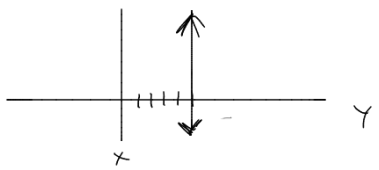
② $\perp$-slope: $m_\perp = 2$

midpt: $\left(\frac{3+7}{2}, \frac{4+2}{2}\right) = (5,3)$ (x_1, y_1)

$$y - 3 = 2(x-5)$$

Other equations of Lines

③ $x = 5$ $\rightsquigarrow$



④ $y = 3$

Ex Find the line b/w $(5,2)$ & $(5,7)$

$m = \dfrac{7-2}{5-5} = \dfrac{5}{0}$ UND

(vertical!)

$x = 5$