

$$1. \frac{3}{2}x + \frac{1}{3} = \frac{1}{4}x - \frac{1}{6}$$

$\begin{matrix} 2 \cdot 2 & 2 \cdot 3 \\ 2 \cdot 2 & 2 \cdot 3 \end{matrix}$

$$\text{LCD} = 2 \cdot 2 \cdot 3 = 12$$

① CLEAR FRACTIONS

$$\frac{3x}{2} \cdot \cancel{2} \cdot \cancel{2} \cdot 3 + \frac{1}{3} \cdot \cancel{2} \cdot \cancel{2} \cdot 3 = \frac{1}{4} \cdot \cancel{2} \cdot \cancel{2} \cdot 3 - \frac{1}{6} \cdot \cancel{2} \cdot \cancel{2} \cdot 3$$

$$\begin{array}{r} 18x + 4 = 3x - 2 \\ - 3x \quad = -3x \\ \hline 15x + 4 = -2 \\ -4 = -4 \\ \hline 15x = -6 \\ \frac{15x}{15} = \frac{-6}{15} \\ x = -\frac{2}{5} \end{array}$$

② WRITE OVER SAME DENOM.

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

$$\frac{18x}{\text{LCD}} + \frac{4}{\text{LCD}} = \frac{3x}{\text{LCD}} - \frac{2}{\text{LCD}}$$

$$\frac{18x+4}{\text{LCD}} = \frac{3x-2}{\text{LCD}}$$

So $18x+4 = 3x-2$

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

$(x-1)(x+1)$

$$\text{LCD} = (x-1)(x+1)$$

$$\left(\frac{4}{x-1}\right)\left(\frac{x+1}{x+1}\right) - \left(\frac{9}{x+1}\right)\left(\frac{x-1}{x-1}\right) = \frac{3}{(x+1)(x-1)}$$

$$\frac{4(x+1) - 9(x-1)}{\text{LCD}} = \frac{3}{\text{LCD}}$$

$$4x+4 - 9x+9 = 3$$

$$-5x+13 = 3$$

$$-5x = -10$$

$$x = 2$$

4. The old combine can harvest the crop in 100 hours, but a new one can do it in 92 hours. How many hours will it take the two of them operating at the same time to harvest the crop?

Let $x =$ the # of hours it takes them to finish.

$$\frac{1}{100} + \frac{1}{92} = \frac{1}{x}$$

$$\text{LCD} = 816$$

$$\text{ACD} = (100)(92)x$$

$$x(100)(92)\left(\frac{1}{100}\right) + (100)(92)x\left(\frac{1}{92}\right) = (100)(92)\left(\frac{1}{x}\right)x$$

$$92x + 100x = (100)(92) = 9200$$

$$192x = 9200$$

$$x = \frac{9200}{192}$$

$$= \frac{\cancel{2} \cdot \cancel{2} \cdot \cancel{2} \cdot \cancel{5} \cdot \cancel{5} \cdot \cancel{23}}{\cancel{2} \cdot 7 \cdot 13} = \frac{4600}{91} \text{ hrs}$$

$$\begin{array}{r} 2 \overline{)192} \\ 7 \overline{)91} \\ 13 \end{array}$$

$$\begin{array}{r} 2 \overline{)9200} \\ \underline{4600} \\ 2 \overline{)2300} \\ \underline{2300} \\ 2 \overline{)1150} \\ \underline{1150} \\ 5 \overline{)575} \\ \underline{575} \\ 5 \overline{)115} \\ \underline{115} \\ 23 \end{array}$$

2, 3, 5, 7, 11, 13,

5. How much 60% antifreeze solutions should be added to 4 quarts of 15% antifreeze solution to yield a 50% antifreeze solution?

$$\begin{array}{l} 60\% \\ 60 \cdot \frac{1}{100} \end{array}$$

=

Let $x =$ the amt of 60% anti freeze sol'n (gts)

	60%	15%	50%
TOTAL	x	4	$x+4$
TOTAL PURE	$.6x$	$(.15)(4)$	$.5(x+4)$

Amt of Pure = Amt of Pure

$$.6x + (.15)(4) = .5(x+4)$$

etc.

Find center & radius.

$$(h, k) = (-3, 4)$$

$$* x^2 + 6x + y^2 - 8y = 96 *$$

$$x^2 + 6x + 3^2 + y^2 - 8y + 4^2 = 96 + 9 + 16$$

$$* (x+3)^2 + (y-4)^2 = 121 *$$

$$\sqrt{121} = 11 = r$$

Solve by quadratic formula & by
completing the square,

$$x^2 - 6x + 11 = 0$$

$$a=1, b=-6, c=11 \quad \text{Discriminant}$$

$$b^2 - 4ac = (-6)^2 - 4(1)(11)$$

$$= 36 - 44 = -8$$

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

$$= \frac{6 \pm 2i\sqrt{2}}{2(1)} = \cancel{2} \frac{3 \pm i\sqrt{2}}{\cancel{2}}$$

$$= 3 \pm i\sqrt{2}$$

$$\{ 3 \pm i\sqrt{2} \} = \{ 3 + i\sqrt{2}, 3 - i\sqrt{2} \}$$

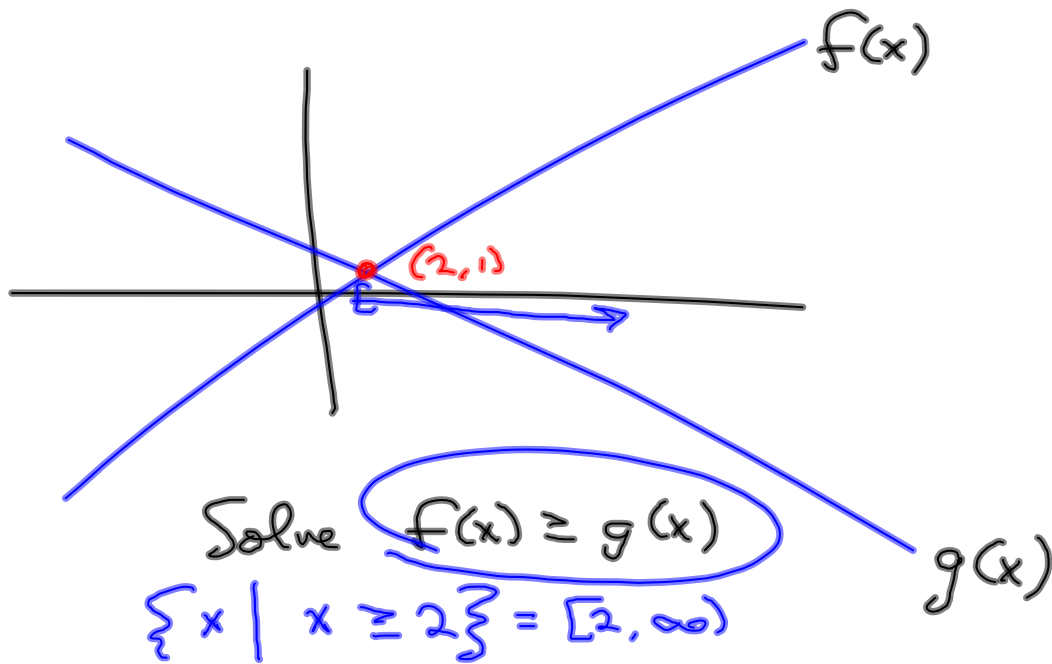
$$\begin{aligned} & \text{S' } 1.7 \neq 9 & \begin{array}{l} 2|8 \\ 2|4 \\ 2 \end{array} \\ & [-7, \infty) \end{aligned}$$

$$\sqrt{-8} = i\sqrt{8}$$

$$= i\sqrt{2 \cdot 2 \cdot 2}$$

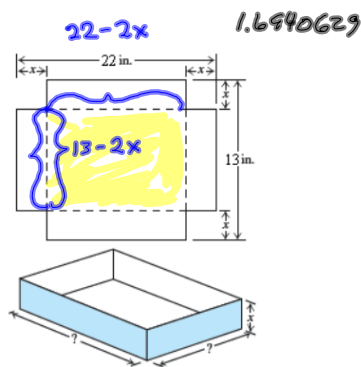
$$= i \cdot 2\sqrt{2}$$

$$= 2i\sqrt{2}$$



A lady wants to make an open-top box for packing baked goods by cutting equal squares from each corner of an 13 in. by 22 in. piece of cardboard as shown in the diagram. She figures that for versatility the area of the bottom must be 90 in.². What size of square should she cut from each corner?

Note that an open-top box is constructed by cutting out equal squares of sides x at each corner, then folding up the sides from the rectangular piece of cardboard with the given dimensions.



Area of bottom = 90

$$(13-2x)(22-2x) = 90$$

$$286 - 26x - 44x + 4x^2 = 90$$

$$4x^2 - 70x + 286 = 90$$

$$2x^2 - 35x + 143 = 45$$

$$2x^2 - 35x + 98 = 0$$

$$2x^2 - 28x - 7x + 98 = 0$$

$$2x(x-14) - 7(x-14) = 0$$

$$(x-14)(2x-7) = 0$$

$$x \in \{7, 14\}$$

$$x = 3.5''$$

$$(2x-13)(2x-22) = 90$$

$$220$$
~~566~~

$$2(98)$$

$$7(49)$$

$$7$$

$$98.2$$

$$= 277.2$$

$$28 + 7 = 35$$

Sweet!