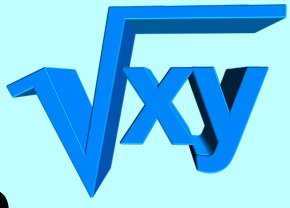
Math 115

Fall 2017

Lecture 29



Simplify:

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

LCD $= x$

$$\frac{x+6+\frac{5}{x}}{x-\frac{25}{x}} = \frac{x\cdot x + x\cdot 6 + x\cdot\frac{5}{x}}{x\cdot x - x\cdot\frac{25}{x}} = \frac{x^2+6x+5}{x^2-25}$$

LCD $= x$

$$= \frac{(x+1)(x+5)}{(x-5)(x+5)} = \boxed{\frac{x+1}{x-5}}$$

Cross-Multiply & Solve

$$\frac{x-3}{4} = \frac{4}{x+3}$$

$(x-3)(x+3) = 4 \cdot 4$

conjugates

$x^2 + 3x - 3x - 9 = 16$

Using Z.F.P.

$x^2 - 9 = 16$

$x^2 - 9 - 16 = 0$

$x^2 - 25 = 0$

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

$x+5=0$ $\quad$ $x-5=0$

$\boxed{x=-5}$ $\quad$ $\boxed{x=5}$

$\{\pm 5\}$

Use LCD to clear fraction, then Solve

$$\frac{x}{x+3} + \boxed{4} = \frac{x}{x+3}$$

LCD $= x+3$, E.V.: -3

$x + 4(x+3) = x$

$x + 4x + 12 = x$

$5x - x = -12$

$4x = -12$

$x = -3$

$\emptyset$

One number plus Five times its reciprocal is equal to 6. Find all such numbers.

$x + 5 \cdot \frac{1}{x} = 6$

Solve $x + \frac{5}{x} = 6$

LCD $= x$

$x^2 + 5 = 6x$

$x^2 - 6x + 5 = 0$

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

$x - 5 = 0$ or $x - 1 = 0$

$x = 5$ $x = 1$

1 & 5

Eric can do a job in 3 hrs alone, while Mark can do the Same job in 5 hrs alone. How long if they work together?

$\frac{1}{3} \cdot t + \frac{1}{5} \cdot t = 1 \Rightarrow \frac{t}{3} + \frac{t}{5} = 1$

LCD $= 15 \Rightarrow 5t + 3t = 15$

$8t = 15$

$t = \frac{15}{8}$ $t = 1.875$

1.875 hrs

SpongeBob and Patrick can do a job together in 4 hrs.

working alone, SpongeBob can do it in 7hrs.

How long does it Patrick to do the job if he works alone?

	Rate
SpongeBob → 7 hrs →	$\frac{1}{7}$
Patrick → x hrs →	$\frac{1}{x}$

$\frac{1}{7}\cdot 4 + \frac{1}{x}\cdot 4 = 1$

$\frac{4}{7} + \frac{4}{x} = 1$

LCD $= 7x$

$7x\cdot\frac{4}{7} + 7x\cdot\frac{4}{x} = 7x\cdot 1$

$4x + 28 = 7x$ → $28 = 3x$ → $x = \frac{28}{3}$ → ≈9 hrs

$4x - 7x = -28$

$-3x = -28$

$x = \frac{-28}{-3}$

Ch.2

Lisa & Laura can do a job in 5 days.

Lisa can do it in 8 days, working alone.

How long does it take Laura to do the job alone?

Lisa → 8 Days →	$\frac{1}{8}$
Laura → x Days →	$\frac{1}{x}$

$\frac{1}{8}\cdot 5 + \frac{1}{x}\cdot 5 = 1$

$\frac{5}{8} + \frac{5}{x} = 1$

LCD $= 8x$

13 days

$8x\cdot\frac{5}{8} + 8x\cdot\frac{5}{x} = 8x\cdot 1$

$5x + 40 = 8x$

$5x - 8x = -40$

$-3x = -40$

$x = \frac{-40}{-3}$ $x \approx 13$

$5x + 5\cdot 8 = 8x$

$40 = 8x - 5x$

$40 = 3x$

$x = \frac{40}{3}$ $x \approx 13$

Pipe A can (fill up) a pool in 8 hrs.

Pipe B can (empty) the pool in 12 hrs.

Assume pool is empty, and both pipes working, How long does it take to fill up the pool?

$\frac{1}{8}\cdot t - \frac{1}{12}\cdot t = 1$

$8 = 2\cdot 2\cdot 2$

$12 = 2\cdot 2\cdot 3$

$LCD = 2\cdot 2\cdot 2\cdot 3 = 24$

Solve $\frac{t}{8} - \frac{t}{12} = 1$

$24\cdot\frac{t}{8} - 24\cdot\frac{t}{12} = 24\cdot 1$

$3t - 2t = 24$

$t = 24$

(24 hrs)

The sum of reciprocals of two cons. odd integers is $\frac{8}{15}$. Find all such integers

Two cons. odd integers → x & $x+2$ → 3, 5

Reciprocals → $\frac{1}{x}$ & $\frac{1}{x+2}$

$\frac{1}{x} + \frac{1}{x+2} = \frac{8}{15}$

$LCD = 15x(x+2)$

$15x(x+2)\cdot\frac{1}{x} + 15x(x+2)\cdot\frac{1}{x+2} = 15x(x+2)\cdot\frac{8}{15}$

$15(x+2) + 15x = 8x(x+2)$

$15x + 30 + 15x = 8x^2 + 16x$

$30x + 30 = 8x^2 + 16x$

$8x^2 + 16x - 30x - 30 = 0$

$8x^2 - 14x - 30 = 0$

$4x^2 - 7x - 15 = 0$

$4x^2 - 7x - 15 = 0$

$a=4 \quad b=-7 \quad c=-15$

$b^2-4ac=(-7)^2-4(4)(-15)=289$

$$x=\frac{-b\pm\sqrt{b^2-4ac}}{2a}=\frac{-(-7)\pm\sqrt{289}}{2(4)}$$

$$x=\frac{7\pm17}{8}$$

$$x=\frac{7+17}{8}=\frac{24}{8}=3$$

$$x=\frac{7-17}{8}=\frac{-10}{8}=\frac{-5}{4}$$

Not an integer

3 & 5

Final Exam

- Review old exams
- Review class quizzes
- Review SG & notes
- Come early if you want

You may come in person to my office after 3:00 PM to know your final grade.