

2.7 Solving Equations in One Variable

Target 2E: Graph, Solve and Analyze Rational Functions

Review of Prior Concepts

Find the least common denominator (LCD) in the following equations

a) $\frac{1}{3x} + \frac{5}{9x^2} = \frac{2}{27}$

b) $2 - \frac{3}{x+4} = \frac{12}{x^2+4x}$

c) $\frac{3x}{x+2} + \frac{2}{x-1} = \frac{5}{x^2+x-2}$

More Practice**Least Common Denominators**<https://www.mathsisfun.com/least-common-denominator.html><http://www.virtualnerd.com/algebra-1/rational-expressions-functions/add-subtract/add-subtract-unlike-denominators/find-least-common-denominator-example><https://www.youtube.com/watch?v=bDIKIHui1E>**SAT Connection****Passport to Advanced Math****9.** Rewrite simple rational expressionsExample: If $x > 3$, which of the following is equivalent

to $\frac{1}{\frac{1}{x+2} + \frac{1}{x+3}}$?

A) $\frac{2x+5}{x^2+5x+6}$

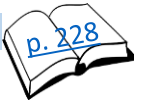
B) $\frac{x^2+5x+6}{2x+5}$

C) $2x+5$

D) x^2+5x+6

[Solution](#)

Solving Rational Equations

Example

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

① Multiply by the Least Common Denominator, LCD.
(to eliminate the fractions/rational expressions)

② Solve for x .

③ Check for extraneous solutions.

Examples:

a) $\frac{3}{x+1} + \frac{2}{x} = 2$

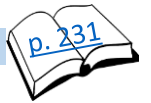
b) $2 - \frac{3}{x+4} = \frac{12}{x^2+4x}$

Solve the equation algebraically. Support your answer graphically.

1.
$$\frac{4x}{x+4} + \frac{3}{x-1} = \frac{15}{x^2+3x-4}$$

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

Application of Rational Functions



Example: Consider all rectangles with an area of 182 square feet. Let x be the length of one side of such a rectangle.

a) Express the perimeter P as a function of x .

b) Find the dimensions of the rectangle that has the least perimeter. What is the least perimeter?

More Practice**Solving Rational Equations**

http://www.montereyinstitute.org/courses/Algebra1/COURSE_TEXT_RESOURCE/U11_L2_T1_text_final.html

<http://www.regentsprep.org/regents/math/algtrig/ate11/rationalequationsles.htm>

<http://www.mathplanet.com/education/algebra-1/rational-expressions/solving-rational-expressions>

<https://www.youtube.com/watch?v=zx82WVQrOCE>

<https://www.khanacademy.org/math/algebra-home/alg-rational-expr-eq-func/alg-modeling-with-rational-functions/v/applying-rational-equations-1>

http://www.mhhe.com/math/devmath/streeter/ia/graphics/streeter5ia/ch07/others/strI_7.6.pdf

<https://www.youtube.com/watch?v=-59ijFaVzpU>

<https://www.youtube.com/watch?v=UcTy7RcZLiw>

<https://www.youtube.com/watch?v=04TKMJVEsXc>

Homework Assignment

p.232 #11,13,16,29,39,40

SAT Connection**Solution**

Choice B is correct. To rewrite $\frac{1}{\frac{1}{x+2} + \frac{1}{x+3}}$, multiply by $\frac{(x+2)(x+3)}{(x+2)(x+3)}$.

This results in the expression $\frac{(x+2)(x+3)}{(x+3) + (x+2)}$, which is equivalent to the expression in choice B.

Choices A, C, and D are incorrect and could be the result of common algebraic errors that arise while manipulating a complex fraction.