2.8 Solving Equations in One Variable

Target 2F: 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=bDIKlHIui1E

SAT Connection

Passport to Advanced Math

9. Rewrite simple rational expressions

Example: If $x > 3$, which of the following is equivalent to $\dfrac{1}{\frac{1}{x+2} + \frac{1}{x+3}}$?

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

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

C) $2x+5$

D) x^2+5x+6

Solution

Solving Rational Equations

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Example

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

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

② Solve for *x*.

③ Check for extraneous solutions.

Examples:

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

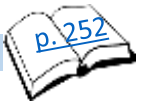
b) $2 - \frac{3}{x+4} = \frac{12}{x^2+4x}$

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

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SAT Connection

Solution

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

This results in the expression $\dfrac{(x+2)(x+3)}{(x+3)+(x+2)}$, 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.