Developing Flexible Procedural Fluency: Comparing Methods
Unit 3 Session 1

Arithmetic: Multiplication of mixed numbers.

Deliberately comparing solution strategies is an important part of developing flexible procedural fluency. In some cases, multiple methods can be used to solve a problem where one method would be preferable over the other, depending on the context. Create a poster which includes the following three phases:

Phase 1: Possible methods:

Method 1: Convert each number to a single fraction then multiply
Method 2: Rewrite each number as addition and use the distributive property of multiplication over addition

Example: 8 ½ x ¾

Phase 2: Use the Star Discussion Phases handout as a guide to identify three reflection questions you would like students to consider after they have looked at the two examples. Clarify the focus of each of the questions as "understanding", "comparing", or "making connections". Also include anticipated student responses to these questions.

Phase 3: Consider whether the following would be good follow up problems for students given the goal of developing flexible procedural fluency. You may want to omit a problem, add another or modify one that you feel would be a better suited for the purpose.

a. 4 ¾ x 2 ½

b. 7 ¾ x 3

c. 4 x (2 ¼ + 3 ¾)

d. 6 ½ x 4 1/3

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Algebra: Solving quadratic equations

Deliberately comparing solution strategies is an important part of developing flexible procedural fluency. In some cases, multiple methods can be used to solve a problem where one method would be preferable over the other, depending on the context. Create a poster which includes the following three phases:

Phase 1: Possible methods:
Method 1: Cover up method
Method 2: Factor and use the Zero Product Property

Solve $(3x-1)^2 - 9=0$ using the two methods above to create student think-alouds of sample work.

Phase 2: Use the Star Discussion Phases handout as a guide to identify three reflection questions you would like students to consider after they have looked at the two examples. Clarify the focus of each of the questions as "understanding", "comparing", or "making connections". Also include anticipated student responses to these questions.

Phase 3: Consider whether the following would be good follow up problems for students given the goal of developing flexible procedural fluency. You may want to omit a problem, add another or modify one that you feel would be a better suited for the purpose.

a. $(x-2)(2x-3) = 6$
b. $2x^2-4x – 5 = 0$
c. $x^2=4$
d. $x^2-3x-4=0$
e. $25\ x^2-100=0$

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Calculus: Finding Derivatives

Deliberately comparing solution strategies is an important part of developing flexible procedural fluency. In some cases, multiple methods can be used to solve a problem where one method would be preferable over the other, depending on the context. Create a poster which includes the following three phases:

Phase 1: Possible methods:

Method 1: Transform the function first (i.e., rewrite the problem in an equivalent form)
Method 2: Quotient rule for derivatives

Find the derivative of f if $f(x) = \frac{x^2-6x+9}{x-3}$ using the two methods above to create student think-alouds of sample work.

Phase 2: Use the Star Discussion Phases handout as a guide to identify three reflection questions you would like students to consider after they have looked at the two examples. Clarify the focus of each of the questions as "understanding", "comparing", or "making connections". Also include anticipated student responses to these questions.

Phase 3: Consider whether the following would be good follow up problems for students given the goal of developing flexible procedural fluency. You may want to omit a problem, add another or modify one that you feel would be a better suited for the purpose.

a) $f(x) = \frac{2x^4-3x+9}{\sqrt{x}}$
b) $f(x) = \frac{2x^2+8x+6}{x+3}$
c) $f(x) = \frac{x^3+6\sqrt{x}}{x+2}$
d) $f(x) = 3(x^3 + 6x)(x^2 + 2)$