

Ready or not: Pretests as a predictor for success in Calc I

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Goals for pretest assessment

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Purposes of a prerequisite knowledge assessment for Calculus I students...

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- ...promotes the “**wisdom of ignorance.**”

Example (Pretest #3)

Simplify $\frac{6x - 12}{x^2 - 4}$.

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- (1) $\lim_{x \rightarrow 2} \frac{6x - 12}{x^2 - 4}$;
- (2) Removable discontinuity of...;

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- (1) $\lim_{x \rightarrow 2} \frac{6x - 12}{x^2 - 4}$;
- (2) Removable discontinuity of...;
- (3) Vertical asymptote of...

Math 1251 Module 3
Simplifying Rational Expressions

NAME _____

Simplify the rational expression. If the rational expression cannot be simplified, so state.

1) $\frac{15x^2 + 24x + 9}{3x + 3}$

1) _____

2) $\frac{y^2 + 4y - 21}{y^2 + 2y - 35}$

2) _____

3) $\frac{5x^2 + 15x^3}{2x + 6x^2}$

3) _____

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Example (Pretest #7)

Simplify $2^{-5}64^{2/3}$.

College Algebra skill: Laws of exponents

Test 1 Calculus skills: Applying the power rule for derivatives.

- (1) Find values of x where $\frac{-x^4 + 5x^2}{x^2}$ has a horiz. tangent line;
- (2) Find $f'(x)$ where $f(x) = \sqrt{x}(x + 3x^5)$...

Math 1251 Module 7
Fractional / Negative Exponents

NAME _____

Evaluate the expression without a calculator.

1) $3^{-1} - 5^{-1}$

1) _____

Simplify. Write answers without negative exponents. Assume that all variables represent nonzero real numbers.

2) $\left(\frac{2x^3y^{-3}}{x^{-4}y^5}\right)^{-3}$

2) _____

3) $\left(\frac{4p^{-4}q}{3^{-1}m^3}\right)^2$

3) _____

Simplify the expression, leaving your answer with only positive exponents. Assume that all variables represent positive numbers.

4) $\left(\frac{x^{-6}}{y^{-4}}\right)^{-1/2}$

4) _____

Data from six sections of Calculus I (F2015 - F2017)

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Initial pretest results:		$n = 147$	
	Overall	Worst	Best
Mean:	3.2	1.9	3.9
Max:	10	7	10

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	Overall	Worst	Best	
Mean:	3.2	1.9	3.9	
Max:	10	7	10	

Final pretest results:		$n = 149$		
	Overall	Worst	Best	
Mean:	5.7	4.3	6.6	
Improved:		$n_i = 69, 46.3\%$		

Performance of students with final pretest ≥ 9 versus < 9 :

Performance of students with final pretest ≥ 9 versus < 9 :

	Final pretest ≥ 9	Final pretest < 9
<i>n</i>	56	93
Took test 1	55	87
Mean	87%	66%
Test 1 Range	[82%, 97%]	[61%, 68%]
DWF	7%	58%
DWF Range	[0%, 25%]	[38%, 64%]

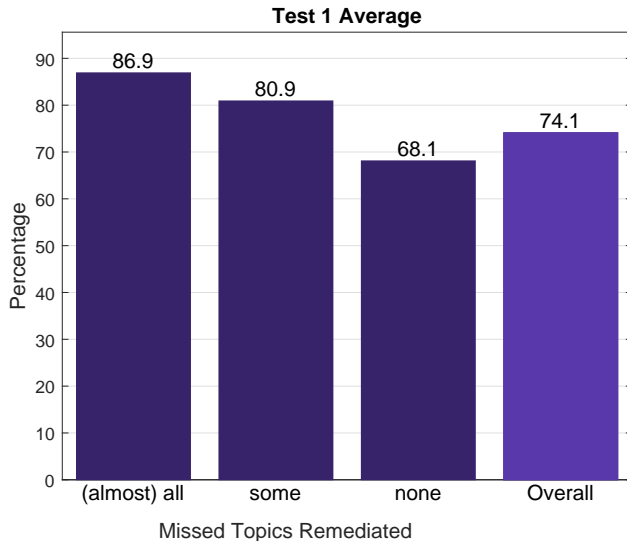
Final > initial pretest score

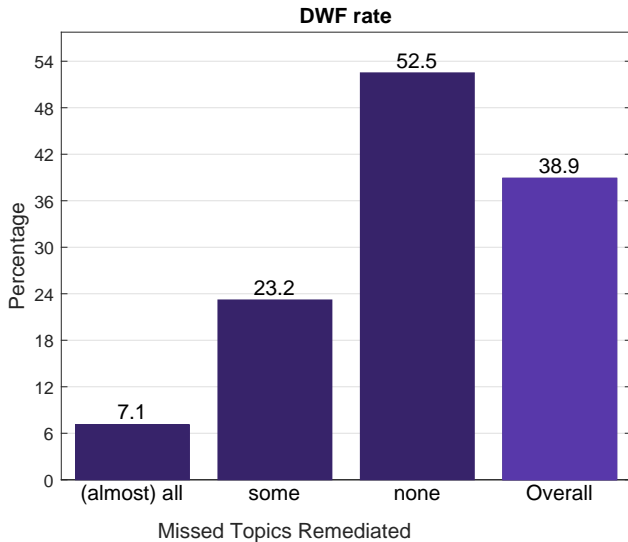
Performance of students who participated in module reviews versus those who did not:

Final > initial pretest score

Performance of students who participated in module reviews versus those who did not:

	Final > initial	Final = initial
<i>n</i>	69	80
Took test 1	68	74
Mean	81%	68%
Test 1 Range	[78%, 88%]	[57%, 75%]
DWF	23%	53%
DWF Range	[18%, 38%]	[35%, 69%]





Future research

- Strategies for bolstering remediation participation;

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- Find a subset of pretest questions that are best indicators of success;
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- What about Calculus 2?

- [1] J. Darley et. al. Research on what calculus students know. Georgia Southern University, 2014.
- [2] J. King. Sotl research to improve student performance in stem gatekeeper mathematics courses. 29th Georgia State University Perimeter College Math Conference, 2016.