Exam Literacy

A ticket out of developmental mathematics
My Students

- All failed Algebra state exam 2 or more times
- Passed all other exams

![Graph showing highest exam grades for four students](image-url)
I HATE MATH
## Monitoring Progress

### ORGANIZATION AND DISPLAY OF DATA

<table>
<thead>
<tr>
<th>AS.1</th>
<th>Categorize data as qualitative or quantitative.</th>
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<tbody>
<tr>
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<tr>
<td>AS.2</td>
<td>Determine whether the data to be analyzed is univariate or bivariate.</td>
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<td>AS.3</td>
<td>Determine when collected data or display of data may be biased.</td>
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<td>AS.4</td>
<td>Compare and contrast the appropriateness of different measures of central tendency for a given data set.</td>
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<td>AS.5</td>
<td>Construct a histogram, cumulative frequency histogram, and a box-and-whisker plot, given a set of data.</td>
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<td>AS.6</td>
<td>Understand how the five statistical summary (minimum, maximum, and the three quartiles) is used to construct a box-and-whisker plot</td>
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<td>AS.7</td>
<td>Create a scatter plot of bivariate data.</td>
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<td>AS.8</td>
<td>Construct manually a reasonable line of best fit for a scatter plot and determine the equation of that line.</td>
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### ATTEMPTS

<table>
<thead>
<tr>
<th>AS.1</th>
<th>1st</th>
<th>2nd</th>
<th>3rd</th>
<th>GRADE</th>
</tr>
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<td>9/11</td>
<td>9/11</td>
<td>6/10</td>
<td>91</td>
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<td>1/13</td>
<td>13/13</td>
<td>13/13</td>
<td>73</td>
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<td>5/10</td>
<td>10/10</td>
<td>7/10</td>
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<td>13/13</td>
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<td>1/80</td>
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<td></td>
<td>3/9</td>
<td>9/9</td>
<td>9/9</td>
<td>180</td>
</tr>
</tbody>
</table>

### REFLECTION

What did I do well? What do I need to improve on? What questions do I still have?

Great start for me but still bad in some parts. Line of best fit isn't one line where you can just put a simple line of "best fit."
The test is coming!!!
The test is coming!!!
What is the test testing?
Decoding: What is the question asking?

Which equation is represented by the graph below?

1. $2y + x = 10$
2. $y - 2x = -5$
3. $-2y = 10x - 4$
4. $2y = -4x - 10$

Equations (linear)
What is the major topic?

Which expression represents \( \frac{x^2 - 3x - 10}{x^2 - 25} \) in simplest form?

(1) \( \frac{2}{5} \)

(2) \( \frac{x + 2}{x + 5} \)

(3) \( \frac{x - 2}{x - 5} \)

(4) \( \frac{-3x - 10}{-25} \)

Expression
What is knowledge does this rely on?

What is the solution set of the system of equations $x + y = 5$ and $y = x^2 - 25$?

(1) $\{(0,5), (11,-6)\}$  
(2) $\{(-5,0), (-6,11)\}$  
(3) $\{(-5,0), (6,11)\}$  
(4) $\{(-5,10), (6,-1)\}$

Equations

$mx + b$  
$y =$  
*calculator

Student Work
Have you seen a question like this before?

Which graph represents a function?

(1)  
(3)  

(2)  
(4)  

Functions
What are the patterns in this type of question?

The cumulative frequency table below shows the length of time that 30 students spent text messaging on a weekend.

<table>
<thead>
<tr>
<th>Minutes Used</th>
<th>Cumulative Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>31–40</td>
<td>2</td>
</tr>
<tr>
<td>31–50</td>
<td>5</td>
</tr>
<tr>
<td>31–60</td>
<td>10</td>
</tr>
<tr>
<td>31–70</td>
<td>19</td>
</tr>
<tr>
<td>31–80</td>
<td>30</td>
</tr>
</tbody>
</table>

Which 10-minute interval contains the first quartile?

(1) 31–40     (3) 51–60
(2) 41–50     (4) 61–70
Characteristics of Multiple Choice: Identifying the Distractors and Misconceptions
Obvious wrong answers

8 If \( A = \{0, 1, 3, 4, 6, 7\} \), \( B = \{0, 2, 3, 5, 6\} \), and \( C = \{0, 1, 4, 6, 7\} \), then \( A \cap B \cap C \) is

(1) \( \{0, 1, 2, 3, 4, 5, 6, 7\} \)  
(2) \( \{0, 3, 6\} \)  
(3) \( \{0, 6\} \)  
(4) \( \{0\} \)

Marked wrong: (2) instead of intersection has 3.

9 Which graph represents a function?
14 What is the vertex of the parabola represented by the equation 
\[ y = -2x^2 + 24x - 100? \]

(1) \( x = -6 \)  
(2) \( x = 6 \)  
(3) \( (6, -28) \)  
(4) \( (-6, -316) \)

Note: A point.

Use the calculator (graph)
When $8x^2 + 3x + 2$ is subtracted from $9x^2 - 3x - 4$, the result is

(1) $x^2 - 2$
(2) $17x^2 - 2$
(3) $-x^2 + 6x + 6$
(4) $x^2 - 6x - 6$

(3) was marked as correct but the equation was underlined to suggest it's an expression. It was written under the choice as a flipped expression.
10 What is the product of \((3x + 2)\) and \((x - 7)\)?

- (1) \(3x^2 - 14\)
- (2) \(3x^2 - 5x - 14\)
- (3) \(3x^2 - 19x - 14\)
- (4) \(3x^2 - 23x - 14\)

If switching up signs turns the answer wrong.
What is the question?

Tools for identifying the correct answer
A.N.6: Evaluating Expressions

If \( t = -3 \), then \( 3t^2 + 5t + 6 \) equals

1) \(-36\)
2) \(-6\)
3) \(6\)
4) \(18\)
Which value of $x$ is the solution of the equation $2(x - 4) + 7 = 3$?

1) 1
2) 2
3) 6
4) 0
What is the solution set of the equation
\[ \frac{x}{5} + \frac{x}{2} = 14 \]?

1) \{4\}
2) \{10\}
3) \{20\}
4) \{49\}
On a certain day in Toronto, Canada, the temperature was 15° Celsius (C). Using the formula \( F = \frac{9}{5} C + 32 \), Peter converts this temperature to degrees Fahrenheit (F). Which temperature represents 15°C in degrees Fahrenheit?

1) -9
2) 35
3) 59
4) 85
A.A.33: Slope: Determine the Slope of a Line

What is the slope of the line containing the points (3, 4) and (−6, 10)?

1) $\frac{1}{2}$  
2) 2  
3) $-\frac{2}{3}$  
4) $-\frac{3}{2}$
What is an equation of the line that passes through the point \((4, -6)\) and has a slope of \(-3\)?

1) \(y = -3x + 6\)
2) \(y = -3x - 6\)
3) \(y = -3x + 10\)
4) \(y = -3x + 14\)
Which linear equation represents a line containing the point (1, 3)?

1) \(x + 2y = 5\)
2) \(x - 2y = 5\)
3) \(2x + y = 5\)
4) \(2x - y = 5\)
What is the question?

Tools for identifying the correct answer
A.A.13: Addition and Subtraction of Polynomials

When $3g^2 - 4g + 2$ is subtracted from $7g^2 + 5g - 1$, the difference is

1) $-4g^2 - 9g + 3$
2) $4g^2 + g + 1$
3) $4g^2 + 9g - 3$
4) $10g^2 + g + 1$
When $-2x^2 + 4x + 2$ is subtracted from $x^2 + 6x - 4$, the result is

1) $-3x^2 - 2x + 6$
2) $-x^2 + 10x - 2$
3) $2x^2 - 2x - 6$
4) $3x^2 + 2x - 6$
A.A.13: Addition and Subtraction of Polynomials

If \(2x^2 - x + 6\) is subtracted from \(x^2 + 3x - 2\), the result is

1) \(x^2 + 2x - 8\)
2) \(x^2 - 4x + 8\)
3) \(-x^2 + 2x - 8\)
4) \(-x^2 + 4x - 8\)
In a baseball game, the ball traveled 350.7 feet in 4.2 seconds.

What was the average speed of the ball, in feet per second?

(1) 83.5
(2) 177.5
(3) 354.9
(4) 1,472.9
In a baseball game, the ball traveled 350.7 feet in 4.2 seconds.

What was the average speed of the ball, in feet per second?
Fluency

What is the factorization of $3x^2 - 7x$ and $(x - 7)$?

(1) $3x^2 - 14$
(2) $3x^2 - 5x - 14$
(3) $3x^2 - 19x - 14$
(4) $3x^2 - 23x - 14$
What is the product of $(3x + 2)$ and $(x - 7)$?

(1) $3x^2 - 14$

(2) $3x^2 - 5x - 14$

(3) $3x^2 - 19x - 14$

(4) $3x^2 - 23x - 14$
Fluency

(1) (0,4)
(2) (2,4)
(3) (4,2)
(4) (8,0)
Results

[Bar chart showing comparisons between highest previous test grades and January results for four students: Student 1, Student 2, Student 3, and Student 4.]
Are My Students College Ready?