# H/Algebra 2 First Semester Final Review

## Unit 1 Review

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| Solve a system of equations with both **substitution** and **elimination** method.<br><br>$2x + 3y = -5$<br>$x - 2y = 8$<br><br><br>Answer: $(2, -3)$ | **Parallel** lines have _____ slopes.<br><br>**Perpendicular** lines have _____ _____ slopes.<br><br>If $f(x) = \frac{2}{5}x - 3$, create a new function g(x) that's perpendicular to f(x) through the point $(4, -1)$<br><br>Answer: $g(x) = -\frac{5}{2}x + 9$ |
| What is the slope formula? _____<br><br>a) What is the slope if the x-int is 4 and the y-int is $-7$?<br><br>b) What is the slope of the following chart?<br><br><table><tr><td>x</td><td>3</td><td>5</td><td>7</td></tr><tr><td>y</td><td>10</td><td>6</td><td>2</td></tr></table><br>Answer: a) $\frac{7}{4}$ b) $-2$ | What do $y = |x|$, $y = x$, $y = x^2$, $y = \sqrt{x}$ look like graphically?<br><br>Graph $f(x) = -3|x + 2| - 4$ using x-y table. Label its transformations from parent function $y = |x|$? (Hint: 4 different transformations)<br><br><br>Answer: Desmos is your best friend=) |
| Create an equation in slope intercept form given two points $(-2, 1)$ & $-5, 10)$<br><br>Hint: Use Point Slope Formula<br><br><br>Answer: $y = -3x - 5$ | If Mr. Ram gives a total of $100 to Ms. Luddy for using her all lecture videos, then pays Ms. Luddy an additional $5 for each quiz she creates for the semester, determine the function that represents the cost for Mr. Ram for using Ms Luddy's videos and x amount of quizzes for the semester.<br><br>Answer: f(x) = _____ x + _____ |

**Use the space below to write/draw key concepts/formulas/graphs for Unit 1:**

# Unit 2 Review

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| If a parabola has a focus of $(0,3)$ and a directrix of $y = -3$, what's the vertex and equation of the parabola? (**Hint: always sketch a graph for this unit**)<br><br>(Also practice problems with horizontal parabolas)<br><br>What if I give you a vertex of $(2,-1)$ and *directrix of* $x = 5$? Can you write an equation?<br><br><br>Answer: V: $(0,0)$, $y = \frac{1}{12}x^2$ | What is the purpose of axis of symmetry? How do you find the axis of symmetry for vertical parabolas? What about horizontal parabolas?<br><br>If a parabola has an axis of symmetry of $y = -2$, and there's a point on the graph at $(1,3)$, can you find another point on the graph?<br><br>Answer: $(1, -7)$ |
| Memorize all transformations. (horizontal/vertical shift, horizontal/vertical shrink/stretch, and reflection over x & y axis)<br><br>If $f(x) = 2x^2 + 3$, create a function g(x) that first reflects over y-axis, then shifts left 5, and finally vertically stretches by 4.<br><br>Answer: $g(x) = 8(x+5)^2 + 12$ | Vertex Formula: _____<br><br>If Mr. Soria throws a football that follows a parabolic trajectory with , what does the x-value of the vertex represent in this context?<br><br>What about the y-value of the vertex?<br><br>Answer: Draw it out and think in terms of time and height. |
| Find out the vertex if the focus is $(3, -2)$ and the directrix is $y = 8$. Then write the function f(x) in standard form.<br><br><br>Answer: V: (3, 3), $f(x) = -\frac{1}{20}(x-3)^2 + 3$ | Find out the x-ints and the y-int given the function $f(x) = 3(x-4)(x+5)$<br><br><br>(Graph it if you want some extra practice)<br><br>Answer: x-ints $(4,0)$ & $(-5,0)$, y-int $(0,-60)$ |

## Use the space below to write/draw key concepts/formulas/graphs for Unit 2:

# Unit 3 Review

| Solve by square roots<br><br>$3(2x-5)^2 - 6 = 12$<br><br><br><br>Answer: $\frac{5\pm\sqrt{6}}{2}$ | Solve by both **factoring** and by **quadratic formula**.<br><br>$6x^2 - 3 = -7x$<br><br><br><br>Answer: $x = \frac{1}{3}$ and $x = -\frac{3}{2}$ |
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| If $a = (2+3i)$ and $b = (-4-5i)$<br><br>Find $a+b,\ a-b,\ and\ a \cdot b$<br><br><br><br><br><br><br><br>Answer: Compare answer with your friends, I'm tired. | What is the number ONE thing you should remember before you attempt to complete the square?<br><br><br>Solve by completing the square<br><br>$-2x^2 + 6x - 10 = 0$<br><br>Answer: $x = \frac{3\pm i\sqrt{11}}{2}$ |
| What is the discriminant? What are the 3 possible outcomes from solving the discriminant?<br><br><br><br><br><br>Still remember how to simplify a radical?<br><br>$\sqrt{96}$<br><br>Answer: It's NOT $2\sqrt{28}$, it's _____. | Solve a system of non-linear equations using substitution.<br><br>&bull; y = x² - 5x + 7<br>&bull; y = 2x + 1<br><br><br><br><br><br><br>Answer: **(1,3)** and **(6,13)** |

**Use the space below to write/draw key concepts/formulas/graphs for Unit 3:**

# Unit 4 Review

| Create a sketch of the graph of the following function<br>$f(x) = x(x-3)(x+2)^2(x+5)$ | What is the end behavior of the function to the left? |
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| What is the degree of the function?<br><br><br><br><br>Answer: Remember Desmos? | As x approaches _____, f(x) approaches _____.<br><br>As x approaches _____, ,f(x) approaches_____.<br><br>Can you also find the end behavior of $y = -3x^5 + 10x^2$? *(Hint: Look at the highest degree to determine the shape, then look at the leading coefficient to determine whether the function if positive or negative)* |
| Freebie (because it's the most simple) question:<br>Multiply $(3x - 2)(x^3 + 2x - 9)$<br><br><br><br><br><br><br>Answer: $3x^4 - 2x^3 + 6x^2 - 31x + 18$ | Long Division (Honestly you can google it and have access to many questions for practice)<br><br>Write down your own long division problem and make sure you have the answer for it.<br><br><br><br>(Hint: Always make sure you fill in the missing terms and put the expression in descending order) |
| Is $(x - 3)$ a factor of $P(x) = 2x^4 + x^3 - 19x^2 - 9x + 9$? Find out using synthetic division, then find out the rest of the solutions by **rational root theorem** $(\pm \frac{p}{q})$<br><br><br><br><br>Answer: x= 3, -3, -1, $\frac{1}{2}$ | a) Factor by grouping $x^3 + 2x^2 - 9x - 18$<br><br><br>b) If $-\sqrt{5}$ & $7i$ are two of the polynomial zeros, what is the least degree of the polynomial?<br><br><br>Answer: a) (x+3)(x-3)(x+2)   b) 4th degree |

## Use the space below to write/draw key concepts/formulas/graphs for Unit 4:

# Unit 5 Review

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| a) Simply $81^{\frac{3}{4}}$<br><br><br><br>b) Simply $(125^{\frac{1}{2}})(25^{\frac{2}{5}})$ | a) Simply $3\sqrt{27x^5} - x^2\sqrt{75x}$<br><br><br><br>b) Simply and remember to rationalize the denominator if needed $\sqrt[5]{\frac{64x}{x^3}}$ |

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| Answer: a) 27, b) $5^{\frac{23}{10}}$ | Answer: a) $4x^2\sqrt{3x}$, b) $\frac{2\sqrt[5]{2x^3}}{x}$ |
| Solve $\sqrt{4n+8} = n + 3$ <br>(hint: always check your solution) <br><br><br> Answer: x=$-1$ | Solve $-3 + (8 - 2x)^{\frac{5}{4}} = 29$ <br><br><br><br> Answer: x= $-4$ |
| Solve $\sqrt{2x-6}+3 \le 9$ <br><br>Hint: Consider the radicand as restricted domain. <br><br><br> Answer: $3 \le x \le 21$ | Find the inverse of $f(x) = 2x^5$ <br><br><br><br> Answer: $\frac{\sqrt[5]{16x}}{2} = g(x)$ |

**Use the space below to write/draw key concepts/formulas/graphs for Unit 5:**