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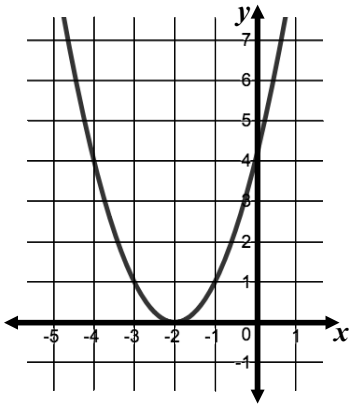
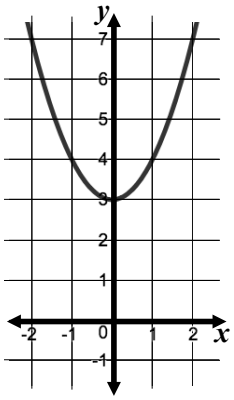
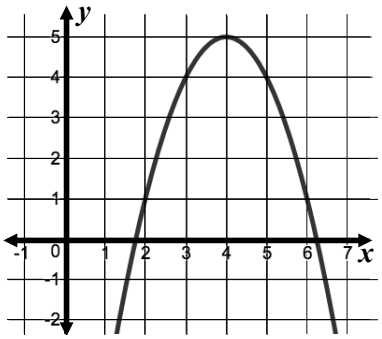
Integrated Math 2 – Semester 1
Final Exam Study Guide

1. Solve the following equation: $40 - 2x = 4(x - 5)$	2. Solve the following equation: $10 + 5x = 2(x + 1)$	3. Solve the following equation: $20 + 5x = 7x + 4$
4. Solve the quadratic equation by factoring, completing the square or by using the Quadratic Formula. Round to the nearest tenth if necessary. $2x^2 + x - 5 = 0$	5. Solve the quadratic equation by factoring, completing the square or by using the Quadratic Formula. Round to the nearest tenth if necessary. $3x^2 - 5x = 2$	6. Solve the quadratic equation by factoring, completing the square or by using the Quadratic Formula. Round to the nearest tenth if necessary. $4x^2 + 4x = -1$
7. Find the equation of the axis of symmetry and the coordinates of the vertex of the graph of $y = -x^2 + 2x + 5$.	8. Find the equation of the axis of symmetry and the coordinates of the vertex of the graph of $y = x^2 + 4x - 5$.	9. Find the equation of the axis of symmetry and the coordinates of the vertex of the graph of $y = -2x^2 + 4x + 6$.
10. Which equation corresponds to the graph shown?  a. $y = (x - 2)^2$ b. $y = (x + 2)^2$ c. $y = x^2 - 2$ d. $y = x^2 + 2$	11. Which equation corresponds to the graph shown?  a. $y = (x + 1)^2 - 3$ b. $y = (x - 1)^2 + 3$ c. $y = x^2 + 3$ d. $y = (x + 3)^2 - 1$	12. Which equation corresponds to the graph shown?  a. $y = -(x - 4)^2 + 5$ b. $y = -(x + 4)^2 + 5$ c. $y = -(x - 4)^2 - 5$ d. $y = -x^2 + 5$
13. Find $(2h + 5)(3h - 2)$.	14. Find $(5r - 2)(-2r + 3)$.	15. Find $(b + 4)(2b - 5)$.
16. Find $(y + 3z)(2y - z)$.	17. Find $(3y + 5z)(3y - 7z)$.	18. Find $(-2y + 1)(2y + 4)$.
19. Find the difference by combining like terms. $(6x^2 - 3x - 3) - (-4x^2 - 4x + 10)$	20. Find the difference by combining like terms. $(5x^2 - 4x - 2) - (-3x^2 + 2x - 5)$	21. Find the difference by combining like terms. $(-7x^2 + 6x - 8) - (2x^2 - 5x + 3)$
22. Distribute by multiplication. $2x(-6x + 5)$	23. Distribute by multiplication. $-3x(7x - 2)$	24. Distribute by multiplication. $2x(4x + 3)$

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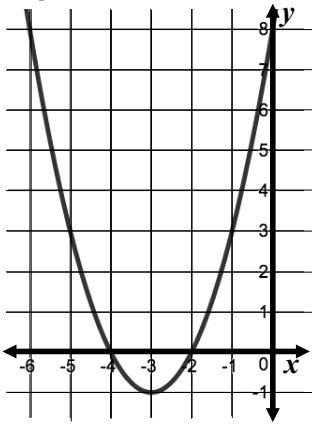
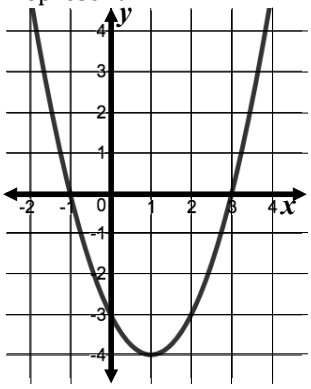
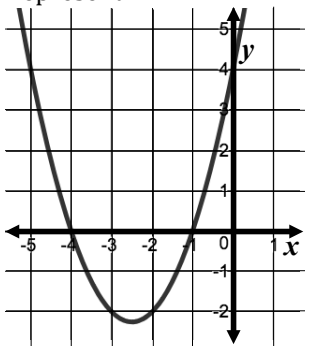
25. Find $(5x^2 + 3x - 2) + (2x^2 - 7x - 1)$.	26. Find $(-9x^2 - 6x - 6) + (3x^2 + 6x - 4)$.	27. Find $(7x^2 - 5x - 8) + (-x^2 - 5x + 6)$.
28. Will the sum of $\sqrt{-64}$ and -3 be real, or complex? If it is real, is it rational or irrational?	29. Will the sum of $\sqrt{36}$ and -5 be real, or complex? If it is real, is it rational or irrational?	30. Will the sum of $\sqrt{12}$ and -4 be real, or complex? If it is real, is it rational or irrational?
31. What is the simplified form of the expression $\sqrt{-81}$?	32. What is the simplified form of the expression $\sqrt{-45}$?	33. What is the simplified form of the expression $-\sqrt{-36}$?
34. Which polynomial does the graph represent?  a. $y = (x - 2)(x - 4)$ b. $y = (x - 2)(x + 4)$ c. $y = (x + 2)(x - 4)$ d. $y = (x + 2)(x + 4)$	35. Which polynomial does the graph represent?  a. $y = (x - 1)(x - 3)$ b. $y = (x - 1)(x + 3)$ c. $y = (x + 1)(x - 3)$ d. $y = (x + 1)(x + 3)$	36. Which polynomial does the graph represent?  a. $y = (x - 1)(x - 4)$ b. $y = (x - 1)(x + 4)$ c. $y = (x + 1)(x - 4)$ d. $y = (x + 1)(x + 4)$
37. Which equation represents a parabola with a vertex at $(-5, 4)$? a. $f(x) = 2(x + 5)^2 + 4$ b. $f(x) = -3(x + 5)(x + 4)$ c. $f(x) = 4(x + 5)(x - 4)$ d. $f(x) = -6(x - 5)^2 + 4$	38. Which equation represents a parabola with a vertex at $(-6, -7)$? a. $f(x) = 5(x - 6)(x - 7)$ b. $f(x) = 4(x + 6)(x - 7)$ c. $f(x) = -8(x + 6)^2 - 7$ d. $f(x) = 3(x - 6)^2 - 7$	39. Which equation represents a parabola with a vertex at $(8, 1)$? a. $f(x) = -6(x + 8)^2 + 1$ b. $f(x) = 3(x - 8)^2 + 1$ c. $f(x) = -5(x - 8)(x - 1)$ d. $f(x) = 4(x + 8)(x + 1)$
40. Solve for *x* and extract the square roots of any perfect squares: $48 = x^2$	41. Solve for *x* and extract the square roots of any perfect squares: $72 = x^2$	42. Solve for *x* and extract the square roots of any perfect squares: $40 = x^2$
43. A baseball player stands at a point that is modeled by $(0, 0)$ on the coordinate plane. He then throws a baseball that is modeled by a quadratic equation. Which piece of information (quadratic property) helps determine when the ball lands on the ground?	44. A baseball player stands at a point that is modeled by $(0, 0)$ on the coordinate plane. He then throws a baseball that is modeled by a quadratic equation. Which piece of information (quadratic property) helps determine the initial height of the ball (at the moment he throws it)?	45. A baseball player stands at a point that is modeled by $(0, 0)$ on the coordinate plane. He then throws a baseball that is modeled by a quadratic equation. Which piece of information (quadratic property) helps determine when the ball starts falling?
46. Use the quadratic formula to solve. $2x^2 + 5x + 4 = 0$	47. Use the quadratic formula to solve. $x^2 - 4x - 2 = 0$	48. Use the quadratic formula to solve. $-5x^2 + 2x - 2 = 0$

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49. Two different quadratic functions are described below: • Function A: This function has roots at 2 and 6, and has a y-intercept at -13. • Function B: This function is represented by the equation $f(x) = 2(x-4)^2 + 5$ Which statement is true about these two quadratic functions? a. Both functions open downwards. b. Both functions have two real solutions. c. Both functions have the same axis of symmetry. d. The vertex of both functions are in Quadrant II.	50. Two different quadratic functions are described below: • Function A: This function has a vertex at $(2, 3)$ and passes through $(4, -1)$. • Function B: This function is represented by the equation $f(x) = -(x+1)^2$ Which statement is true about these two quadratic functions? a. Both functions open upward. b. Both functions have the same y-intercept. c. Function A has two real solutions and function B has two imaginary solutions. d. Both functions have the same axis of symmetry.	51. Two different quadratic functions are described below: • Function A: This function has roots at -4 & -2 and passes through $(1, 8)$ • Function B: This function is represented by the equation $f(x) = -(x-2)(x-4)$ Which statement is true about these two quadratic functions? a. The vertex of function A is lower on the graph than the vertex of function B. b. Both functions have the same roots. c. Both functions have the same y-intercept. d. The vertex of both functions are in Quadrant III.
52. The cost, y, in dollars, of parking a car for x hours at a parking lot during the day is shown using the function below. $y = \begin{cases} 2, & 0 \le x \le 3 \\ x, & 3 < x \le 7 \end{cases}$ Create a graph that models the cost of parking at this parking lot.	53. The cost, y, in dollars, of parking a car for x hours at a parking lot during the day is shown using the function below. $y = \begin{cases} x+2, & 0 \le x \le 5 \\ 9, & 5 < x \le 10 \end{cases}$ Create a graph that models the cost of parking at this parking lot.	54. The cost, y, in dollars, of parking a car for x hours at a parking lot during the day is shown using the function below. $y = \begin{cases} 3x, & 0 \le x < 2 \\ 7, & 2 \le x \le 6 \end{cases}$ Create a graph that models the cost of parking at this parking lot.
55. Frank correctly factored $6x^2 - 17x - 3$ as $(x-3)(6x+1)$. He then claimed that the zeros of that quadratic function $f(x) = 6x^2 - 17x - 3$ are located at $x = 3$ and $x = -1$. A. Explain Frank's mistake. B. Determine the correct zeros.	56. Eduardo correctly factored $5x^2 + 32x - 21$ as $(5x-3)(x+7)$. He then claimed that the zeros of that quadratic function $f(x) = 5x^2 + 32x - 21$ are located at $x = 7$ and $x = -\frac{3}{5}$. A. Explain Eduardo's mistake. B. Determine the correct zeros.	57. Janice correctly factored $3x^2 - 19x + 20$ as $(3x-4)(x-5)$. She then claimed that the zeros of that quadratic function $f(x) = 3x^2 - 19x + 20$ are located at $x = 5$ and $x = 4$. A. Explain Janice's mistake. B. Determine the correct zeros.
58. A rocket is launched from 224 feet above the ground at time $t = 0$. The function that models this situation is given by $h = -16t^2 + 80t + 224$, where t is measured in seconds and h is height above the ground measured in feet. A. Determine the maximum height obtained by the rocket. Show all work. B. Determine the time at which the rocket hits the ground. Show all work.	59. A rocket is launched from 192 feet above the ground at time $t = 0$. The function that models this situation is given by $h = -16t^2 + 64t + 192$, where t is measured in seconds and h is height above the ground measured in feet. A. Determine the maximum height obtained by the rocket. Show all work. B. Determine the time at which the rocket hits the ground. Show all work.	60. A rocket is launched from 240 feet above the ground at time $t = 0$. The function that models this situation is given by $h = -16t^2 + 32t + 240$, where t is measured in seconds and h is height above the ground measured in feet. A. Determine the maximum height obtained by the rocket. Show all work. B. Determine the time at which the rocket hits the ground. Show all work.

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61. Determine the solutions to the equation (use the form $j \pm \sqrt{k}$, where j and k are integers).

$$x^2 + 13x = -20$$

62. Determine the solutions to the equation (use the form $j \pm \sqrt{k}$, where j and k are integers).

$$x^2 - 15x = -40$$

63. Determine the solutions to the equation (use the form $j \pm \sqrt{k}$, where j and k are integers).

$$x^2 + 17x = -35$$

64. Rewrite the quadratic equation in standard form.

$$f(x) = (2x + 5)^2 - 4$$

65. Rewrite the quadratic equation in standard form.

$$g(x) = (4x - 7)^2 + 5$$

66. Rewrite the quadratic equation in standard form.

$$h(x) = (5x - 3)^2 + 7$$

67. The equation $x^2 - 18x + 24 = 0$ can be transformed into an equation of the form $(x - p)^2 = q$, where p and q are rational numbers. Complete the table below with the values of p and q.

Constant	Value
p	
q	

68. The equation $x^2 + 24x - 13 = 0$ can be transformed into an equation of the form $(x - p)^2 = q$, where p and q are rational numbers. Complete the table below with the values of p and q.

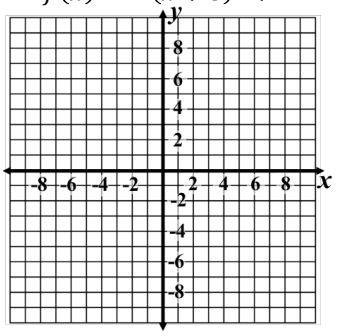
Constant	Value
p	
q	

69. The equation $x^2 - 20x + 78 = 0$ can be transformed into an equation of the form $(x - p)^2 = q$, where p and q are rational numbers. Complete the table below with the values of p and q.

Constant	Value
p	
q	

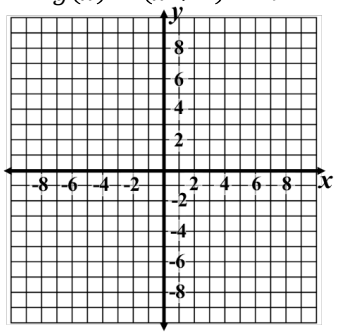
70. Graph. Label the vertex and axis of symmetry.

$$f(x) = -(x + 3)^2 + 4$$



71. Graph. Label the vertex and axis of symmetry.

$$g(x) = (x + 2)^2 - 9$$



72. Graph. Label the vertex and axis of symmetry.

$$h(x) = 2(x - 2)^2 - 8$$