Algebra 2 Semester 1 Final Review

SHOW ALL WORK on a separate piece of paper. This is due ON OR BEFORE the day of the final and is worth up to 3% extra credit on your Final Exam grade.

Solve the equation for y.

1. $2xy + x = 12$
2. $\frac{2x+y}{3} = 5$

Graph each function

3. $y = -\frac{1}{3}(x+1)(x-5)$
4. $y = -2x^2 + 8x - 5$
5. $y = (x+3)^2 + 1$
6. $y = 2\sqrt{x+3} - 4$
7. $y = -2\sqrt[3]{x+1} + 5$
8. $y = -|x+5| + 7$
9. $y = 3(x+2)^3 - 4$
10. Graph $y \le -x^2 + 4x + 2$

Solve the quadratic equation using any method.

11. $3(p-9)^2 = 81$
12. $7x^2 - 3 = 11$
13. $x^2 + 4 = -32$
14. $m^2 + 8m = -3$
15. $2x^2 + 1 = -15$

Write the expression as a complex number in standard form.

16. $(8+i)(6+2i)$
17. $(-4+2i) - (7-3i)$
18. $\frac{2+i}{2-i}$

Perform the indicated operation.

19. $\left(3x^2 - 5x + 7\right) - \left(2x^2 + 9x - 1\right)$
20. $\left(12x^3 + 31x^2 - 17x - 6\right) \div (x+3)$
21. $(2x-3)\left(5x^2 - x + 6\right)$
22. $\left(8x^4 + 5x^3 + 4x^2 - x + 7\right) \div (x+1)$
23. Graph the relation. Then tell whether the relation is a function.

x	2	−3	4	0	−3	1
y	2	−2	0	2	3	−1

Evaluate:

24. $8^{4/3}$.
25. $16^{-5/4}$

Simplify:

26. $\sqrt[4]{512} + 3\sqrt[4]{2}$
27. $\sqrt{\frac{16xy^2}{27z^5}}$

28. $\sqrt[3]{6x^3y^7} \cdot \sqrt[3]{4x^5}$

29. $(x^{-2/5}y^{1/3})^{15}$

30. $5\sqrt[3]{64x^7} - x\sqrt[3]{8x^4}$

31. Given $f(x) = 80 - 3x$; find $f(5)$

Factor the polynomial completely.

32. $n^5 + 216n^2$

33. $5x^4 + 10x^2 - 15$

34. $2x^3 - 3x^2 + 4x - 6$

35. $64x^3 + 343$

36. $16x^2 - 4y^2$

37. $54y^3 + 2$

Describe the end behavior of the graph of the polynomial function and graph the function.

38. $y = x^4 - 2x^2 - x - 1$

39. $y = -3x^3 - 6x^2$

Find the discriminant of the equation and give the number and type of solutions of the equation.

40. $4x^2 + 2x - 5 = 0$

41. $x^2 + 7 = 3x$

Let $f(x) = 3x$ and $g(x) = x - 5$. Perform the indicated operation and state the domain.

42. $f(x) + g(x)$

43. $f(x) - g(x)$

44. $f(x) \cdot g(x)$

45. $\dfrac{f(x)}{g(x)}$

Solve the equation. Check for extraneous solutions.

46. $3\sqrt{2x+4} = 12$

47. $3 = |-6 + 3b|$

48. $|2x + 3| = 3x$

49. $|5x - 6| = x$

50. $|x + 1| = 4x$

51. $\sqrt[3]{x-5} = -3$

52. $3x^{3/4} = 192$

Solve the absolute value inequality.

53. $|3x + 4| > 5$

54. $|2x - 4| - 1 > 0$

55. $|x + 8| \geq 10$

Find all zeros of the polynomial function.

56. $f(x) = x^3 - 24x - 32$

57. $f(x) = x^3 - 4x^2 - 11x + 2$

58. $f(x) = x^4 - 2x^3 - 23x^2 - 2x - 24$

59. $4x^3 - 8x^2 - x + 2 = 0$

60. $3x^4 - 11x^2 - 20 = 0$

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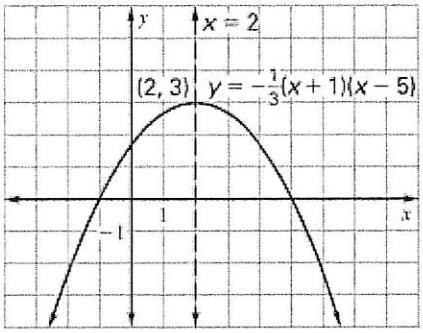
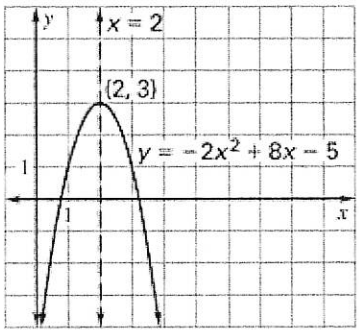
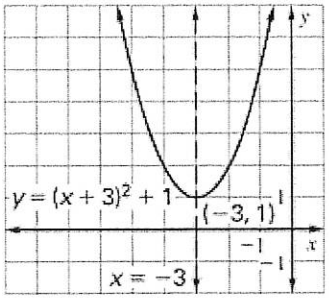
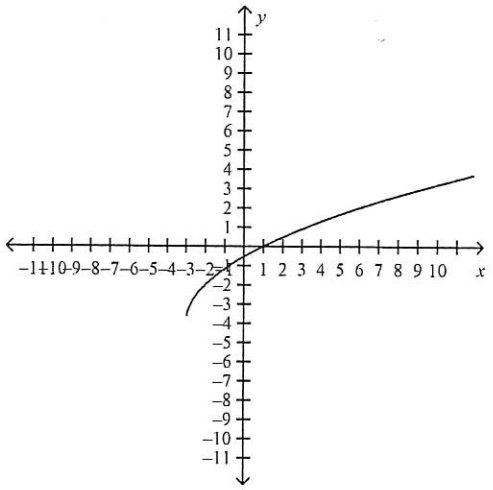
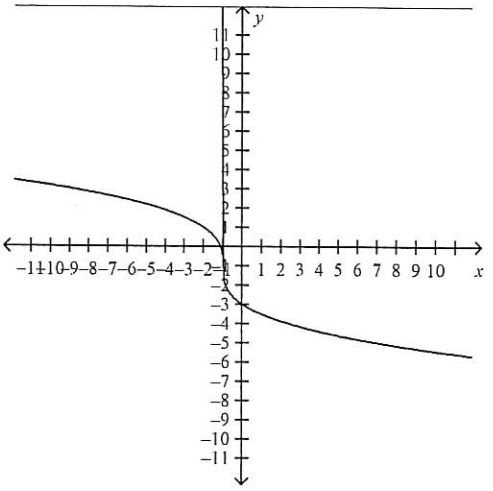
Answer Section

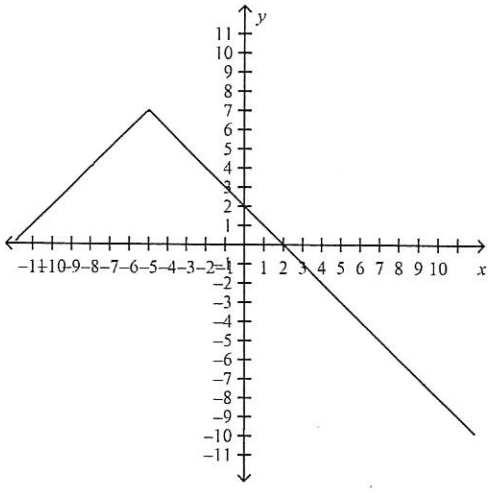
1. $y = \dfrac{12 - x}{2x}$
2. *15-2x*
3. 

4. 

5. 

6. 

7. 

8. 

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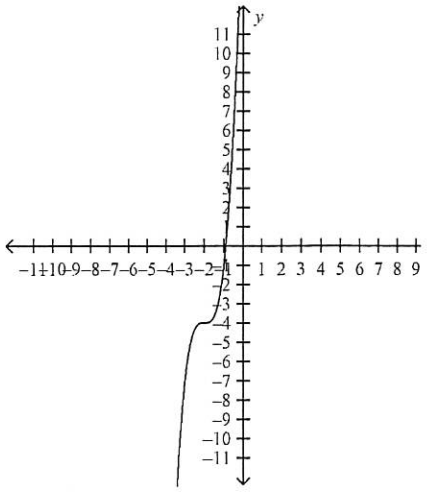
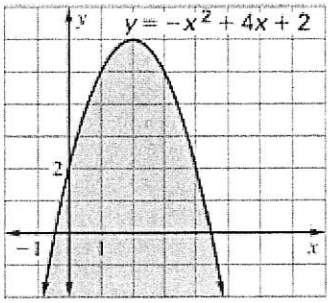
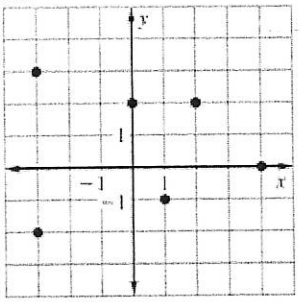


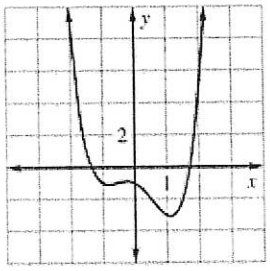
10.



11. $p = 9 \pm 3\sqrt{3}$
12. $x = \pm\sqrt{2}$
13. $\pm 6i$
14. $m = -4 \pm \sqrt{13}$
15. $2i\sqrt{2},\ -2i\sqrt{2}$
16. $46 + 22i$
17. $-11 + 5i$
18. $\dfrac{3+4i}{5}$
19. $x^2 - 14x + 8$
20. $12x^2 - 5x - 2$
21. $10x^3 - 17x^2 + 15x - 18$
22. $8x^3 - 3x^2 + 7x - 8 + \dfrac{15}{x+1}$
23. no

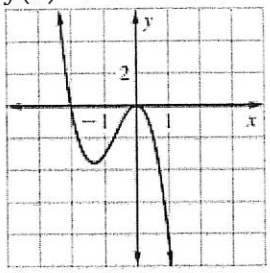


24. 16
25. $\dfrac{1}{32}$
26. $7\sqrt[4]{2}$
27. $\dfrac{4y\sqrt{3xz}}{9z^3}$
28. $2x^2y^2\sqrt[3]{3x^2y}$
29. $\dfrac{1}{x^{10}} \cdot y^5$
30. $18x^2\sqrt[3]{x}$
31. 65
32. $n^2(n+6)\left(n^2 - 6n + 36\right)$
33. $5\left(x^2+3\right)(x-1)(x+1)$
34. $(2x-3)\left(x^2+2\right)$
35. $(4x+7)\left(16x^2 - 28x + 49\right)$
36. $4\left(2x+y\right)\left(2x-y\right)$
37. $2\left(3y+1\right)\left(9y^2 - 3y + 1\right)$
38.



$f(x) \to +\infty$ as $x \to -\infty$,
$f(x) \to +\infty$ as $x \to -\infty$

39. $f(x) \to +\infty$ as $x \to -\infty$, $f(x) \to -\infty$ as $x \to +\infty$



40. 84; two real solutions
41. –19; two imaginary solutions
42. $4x - 5$;
Domain: all real numbers
43. $2x + 5$;
Domain: all real numbers
44. $3x^2 - 15x$;
Domain: all real numbers
45. $\dfrac{3x}{x-5}$;
Domain: all real numbers except 5
46. 6
47. 3, 1
48. $x = 3$
49. $1, \dfrac{3}{2}$
50. $\dfrac{1}{3}$
51. –22
52. $x = 256$
53. $x > \dfrac{1}{3}$ or $x < -3$
54. $x > \dfrac{5}{2}$ or $x < \dfrac{3}{2}$
55. $x \geq 2$ or $x \leq -18$
56. $-4, 2 \pm 2\sqrt{3}$
57. $-2, 3 \pm \sqrt{2}$
58. $-4,\ 6,\ \pm i$
59. $x = 2, \dfrac{1}{2}, -\dfrac{1}{2}$
60. $x = \pm\sqrt{5}, \pm\dfrac{2i\sqrt{3}}{3}$