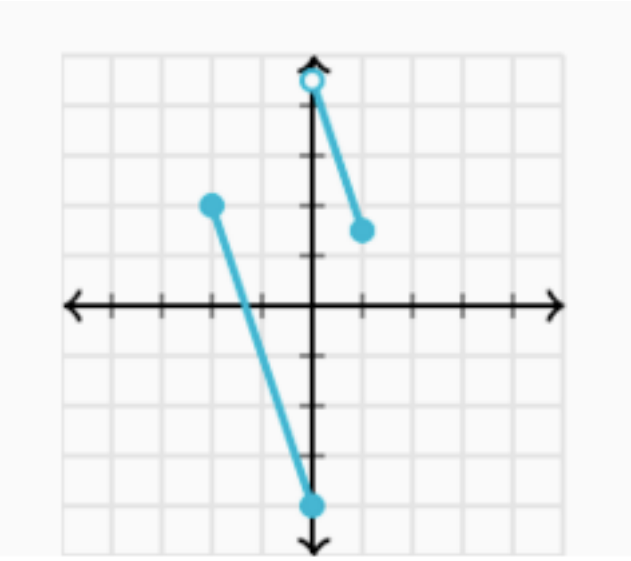
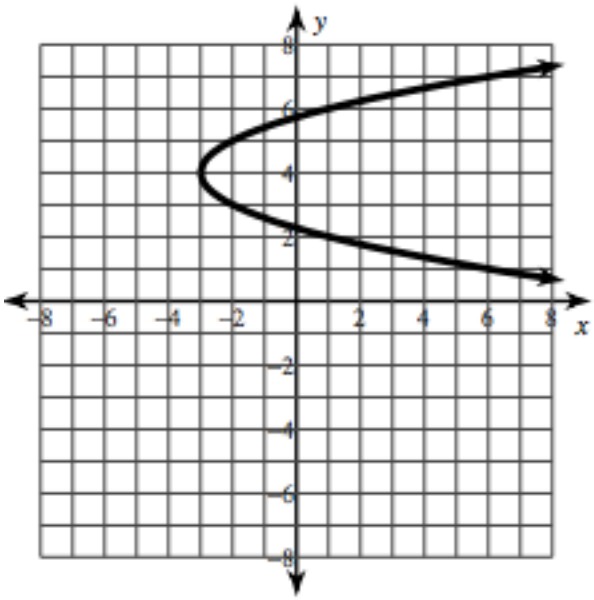
Algebra 2 Midterm Review

Solve. Graph the solution on a number line.	Solve. State the solution in interval notation.
1. $2(3x+1) > 2+3(x-4)$	2. $1-3x-3 \le 4x+5$

State the domain and range in set notation. Is the graph a function?

3.	4.
	

Evaluate.

5. $5-3^2 \cdot 4+1$	6. $2(5-7)^3+2^4$

Use the equations of f(x), g(x) and h(x) to evaluate. Give your answer in simplest form.

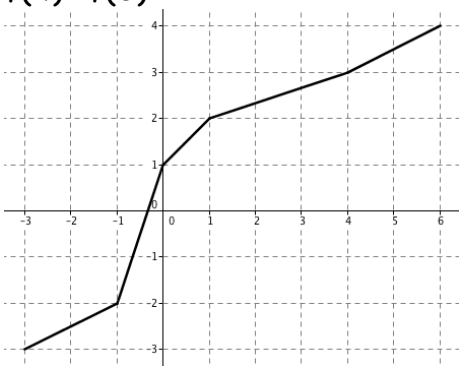
$f(x) = x^2 - 3x + 4$ $\qquad$ $g(x) = -8x + 7$ $\qquad$ $h(x) = \begin{cases} |4x-6| & x \le 1 \\ \sqrt{x} & x > 1 \end{cases}$

7. $g(x+1)$	8. $f(-3)$	9. $h(1)+h(9)$

10. State the x and y intercepts. Then sketch. $3x - 2y = 12$

11. Sketch $h(x) = \begin{cases} 1 & x < 2 \\ -x + 3 & x \geq 2 \end{cases}$

12. Given the graph of f(x) below, evaluate f(4)+ f(0)



13. Given a point (-5, 1) and slope 2: write the equation of a line in

a) slope-intercept form	b) point-slope form

Find the information below then sketch the graph.

14. $f(x) = (x-2)^2 - 3$

Which way does it open?_____

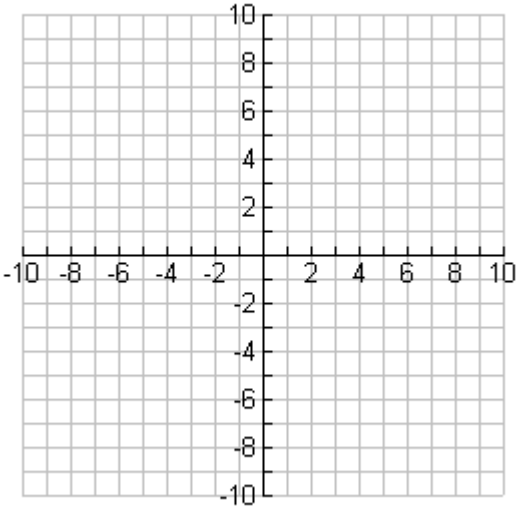
Has a MAX or MIN?_____

Value of _____

Vertex: _____

Axis of Symmetry:_____

y-intercept_____



Domain(SET)_____ Range(SET)_____

Write the function in standard form: _____

Factor completely.

15. $x^2 - 8x + 16$	16. $3x^2 - 11x - 20$	17. $9x^3 - 25x$

18. Does $y = 3x^2 - 6x + 1$ have a maximum or minimum value? Find the value.

Simplify.

19. $8\sqrt{50}$	20. $\sqrt{-100} + 2\sqrt{-9}$	21. $\frac{12}{\sqrt{3}}$	22. $4\sqrt{-18}$

Perform the indicated operation. Write the answer in standard form (a + bi)

23. $(4+3i) - 2(4+i)$	24. $(1-2i)(1+2i)$	25. $\frac{2}{i}$

Solve.

26. $2x^2 + 9x + 7 = 0$	27. $16x^2 - 59 = 5$	28. $x^2 - x - 72 = 0$

Find the discriminant and state the number and type of solutions. Then solve using the quadratic formula.

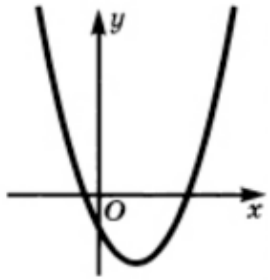
29. $3x^2 - 2x + 4 = 0$

30. Write a quadratic function, f(x), in standard form with integral coefficients with the given zeros. (5, 0) and (-3, 0)

31. Let D be the value of the discriminant. Match each with the value of its discriminant. You may use the choices more than once.

a. $D > 0$ b. $D < 0$ c. $D = 0$

i)



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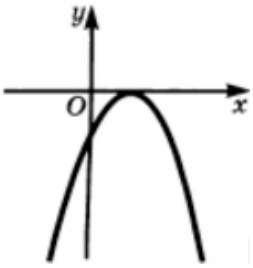

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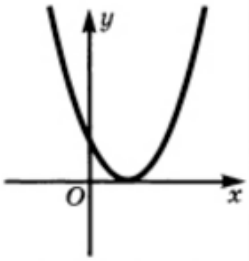

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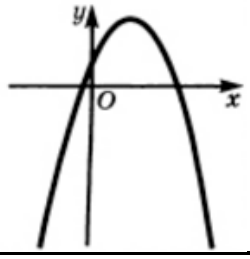

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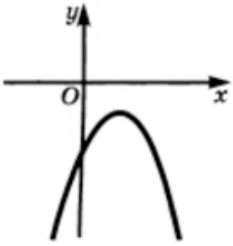

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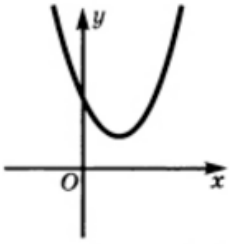


Set up an equation then solve.

32. The product of two consecutive positive even integers is equal to 20 more than twice their sum. Find the numbers.

33. The length of a photograph is 5 less than twice the width. The area is 42 cm^2. Find the dimensions of the rectangle.

A small projectile is launched. The height, h(t) in feet of the projectile after *t* seconds can be modeled by the function $h(t) = -16t^2 + 64t + 5$

34. At what time will the ball reach its maximum height?
35. What is the maximum height?

Perform the indicated operation and simplify.

36. $\left(5x^2 - 6x + 2\right) + 5\left(x + 9\right)$	37. $(x+1)\left(2x^2 - 3x + 2\right)$

Simplify. Your answer should contain only positive exponents.

38. $(3xy)(5x^2y^3)^2$	39. $\dfrac{4a^{20}}{(2a^4 \cdot a^{-1})^3}$

Classify the polynomial by degree and number of terms.

40. -4a + 6	41. $10n^2 + 2n^3 - 3n^4$

Divide.

42. $(x^3 - 2x^2 - 4) \div (x - 2)$	43) $(2x^2 + x - 4) \div (2x + 1)$

Factor completely.

44. $x^3 - 8$	45. $3x^4 - 8x^2 + 5$	46. $6x^3 + 5x^2 - 30x - 25$

47. Find all zeros given that 4 is a zero. $f(x) = x^3 + 3x^2 - 18x - 40$	48. Find all roots given (x – 1) is a factor. $3x^3 - 7x^2 + 5x - 1 = 0$

State the possible rational zeros for each function.

49. $y = 3x^3 - x^2 + 2x + 6$	50. $y = x^3 - 5x^2 + 3x + 8$

Solve.

51. $4x^5 - 28x^3 - 32x = 0$	52. $x^4 + x^2 - 2 = 0$	53. $2x^3 + x^2 - 5x + 2 = 0$

Write a polynomial function of least degree with integral coefficients that has the given zeros.

54. 0 (mult of 2), -1, 1/2	55. $2, 4i, -4i$

Answers:

1. x > -4 (graph on last page)
2. [-1, infinity)
3. D: $\{x| -2 \leq x \leq 1\}$; R: $\{y| -4 \leq y < 5\}$; yes a function
4. D: $\{x|x \geq -3\}$; R: $\{y|y \in R\}$; not a function
5. -30
6. 0
7. -8x – 1
8. 22
9. 5
10. x-int (4, 0); y-int (0, -6);graph on last page
11. graph on last page
12. 4
13. .
    a. y = 2x + 11
    b. y – 1 = 2(x + 5)
14. .
    a. up
    b. minimum
    c. -3
    d. (2, -3)
    e. x = 2
    f. (0, 1)
    g. {x|x E R}
    h. {y|y >= -3}
    i. $f(x) = x^2 - 4x + 1$
15. (x – 4)(x – 4)
16. (3x + 4)(x – 5)
17. x(3x – 5)(3x + 5)
18. minimum at -2
19. $40\sqrt{2}$
20. 16i
21. $4\sqrt{3}$
22. $12i\sqrt{2}$
23. 12 + 2i
24. 5 + 0i
25. 0 – 2i
26. -7/2, -1
27. 2, -2
28. .
29. discriminant = -44; 2 distinct imaginary solutions; $x = \frac{1 \pm i\sqrt{11}}{3}$
30. $f(x) = x^2 - 2x - 15$
31. .
    a. a
    b. c
    c. c
    d. a
    e. b
    f. b
32. .
33. 6cm x 7cm
34. 2 seconds
35. 69 feet
36. $5x^2 - x + 47$
37. $2x^3 - x^2 - x + 2$
38. $75x^5y^7$
39. a^{11}
40. linear binomial
41. quartic trinomial
42. $x^2 + \frac{-4}{x-2}$
43. $2x - 1 + \frac{-3}{x+1}$
44. $(x - 2)(x^2 + 2x + 4)$

45. $(3x^2 - 5)(x - 1)(x + 1)$

46. $(x^2 - 5)(6x + 5)$

47. $x = 4, -2, -5$

48. $x = 1$ w/ mult of 2, 1

49. $\pm 1, \pm \frac{1}{3}, \pm 2, \pm \frac{2}{3}, \pm 6$

50. $\pm 1, \pm 2, \pm 4, \pm 8,$

51. $x = 0, \pm 2\sqrt{2}, \pm i$

52. $x = \pm i\sqrt{2}, 1, -1$

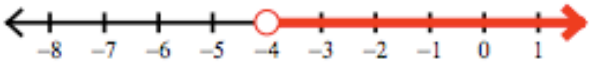
53. $x = 1, \frac{1}{2}, -2$

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

55. $f(x) = x^3 - 2x^2 + 4x - 8$

Graphs

#1



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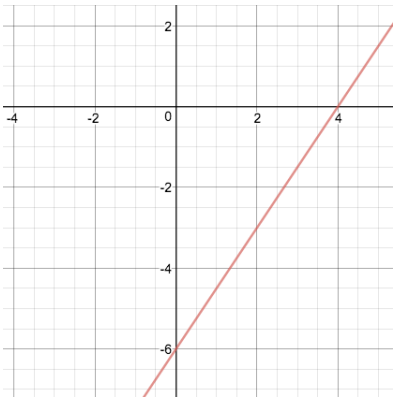

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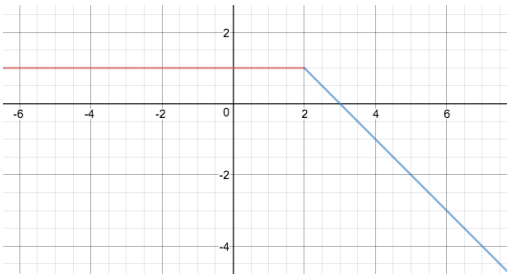

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