

Name _____ Period _____ Date _____
Algebra 2: Review Worksheet A
Topic 4: Quadratic Equations and Parabolas

Directions: Calculators are not allowed. Show any work on a separate sheet of paper and attach. Express any imaginary answers in terms of "i".

Perform the indicated operation. Express your answer as a real or complex number.

- | | | |
|--------------------------|--------------------------|--------------------------|
| 1) $(4 - 6i) + (2 - i)$ | 2) $(8 + 4i) + (6 - 2i)$ | 3) $(7 + 3i) - (2 - 5i)$ |
| 4) $(2 - 6i) - (3 - 2i)$ | 5) $6i(2i)$ | 6) $(4 + i)(4 - i)$ |
| 7) $(2 + 5i)(3 - i)$ | 8) $(6 + 2i)(1 + 5i)$ | 9) $\frac{5}{2+i}$ |
| 10) $\frac{6}{3-2i}$ | 11) $\frac{3+3i}{2+5i}$ | 12) $\frac{4-2i}{1-4i}$ |

If $i = \sqrt{-1}$, find the value of each of the following:

- 13) i^2 14) i^3 15) i^4 16) i^5 17) i^{10} 18) i^{12}

Plot each of the following complex numbers on a single grid and label with the given letter.

- 19) A: $3 + 2i$ 20) B: $-5 + i$ 21) C: $2 - 4i$ 22) D: $-1 - 3i$

Find the solutions to the following equations. Express any imaginary numbers in terms of "i".

- 23) $x^2 + 4x + 8 = 0$ 24) $3x^2 - 4 = 71$ 25) $x^2 - 2x - 24 = 0$ 26) $x^2 = 8x$
27) $x^2 + 36 = 0$ 28) $2x^2 - x + 5 = 0$ 29) $2x^2 + 3x - 5 = 0$

30) There are two numbers with the following properties.

- 1) The second number is 3 more than the first number.
- 2) The product of the two numbers is 9 more than their sum.

Which of the following represents possible values of these two numbers?

- A) -6, -3 B) -4, -1 C) -1, 4 D) 4, 1

31) What are the zeros of the function $f(x) = x^2 - x - 12$?

32) What are the x-intercepts of the graph of $y = 3x^2 - 13x - 10$?

33) Determine the maximum value of the function $f(x) = -2(x - 3)^2 + 4$.

34) Determine the minimum value of the function $f(x) = 5(x + 2)^2 + 3$.

35) What is the minimum point of $y = x^2 + 6x - 4$?

36) What is the maximum point of $y = -x^2 - 8x + 5$?

37) Write the equation $y = 2x^2 - 20x + 1$ in the completed square form: $y = a(x - h)^2 + k$

38) If $0 < a < 1$, how does the graph of $y = ax^2$ compare to the graph of $y = x^2$?

39) If $a > 1$, how does the graph of $y = ax^2$ compare to the graph of $y = x^2$?

40) If $a < 0$, how does the graph of $y = ax^2$ compare to the graph of $y = x^2$?

41) Describe the translation of the graph $y = (x + 5)^2 + 2$ to the graph of $y = (x - 1)^2 - 3$.

42) Describe the translation of the graph $y = (x - 2)^2 - 1$ to the graph of $y = (x + 6)^2 - 4$.

Problems 43 - 45: Given the following statements, which ones would be true for the following pairs of parabolas. More than one statement may be true.

- A) Their vertices are maximums.
- B) The graphs have the same shape with different vertices.
- C) The graphs have different shapes with different vertices.
- D) One graph has a vertex that is a maximum, while the other graph has a vertex that is a minimum.
- E) Their vertices are minimums.

43) $y = -4(x + 5)^2 - 3$ and $y = -4(x + 5)^2 + 3$

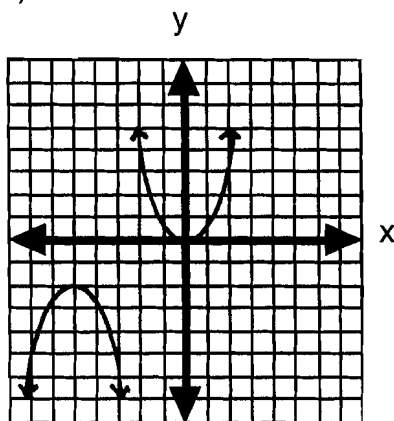
44) $y = 2(x + 8)^2 + 4$ and $y = -3(x + 2)^2 + 1$

45) $y = 6(x + 2)^2 - 7$ and $y = 6(x + 1)^2 - 3$

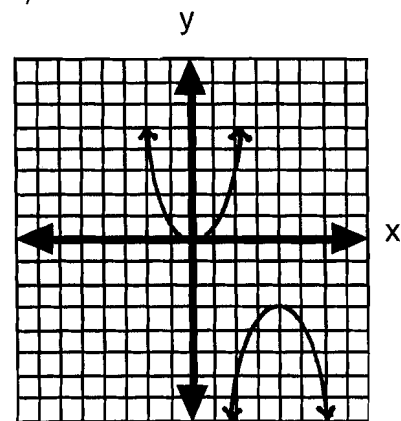
46) The function $f(x) = (x - b)^2 + c$ is a parabola that opens upward with a minimum at the vertex point $(-1, 6)$. Use this information to find the constants b and c .

Use the given diagram. The equation of the top graph is $y = x^2$. What is the equation of the bottom graph?

47)



48)



49) Sketch a graph of $y = 2(x + 2)^2 - 4$.

50) Sketch a graph of $y = -\frac{1}{2}(x - 1)^2 + 3$.