

Algebra 2 Midterm Review**Short Answer**

1. Find the complex conjugate of $3i + 4$.
2. Divide by using long division: $(5x + 6x^3 - 8) \div (x - 2)$.
3. Classify $-x^5 + x^4 - 9x^3 + 6$ by degree.

Determine whether the function is linear or quadratic. Identify the quadratic, linear, and constant terms.

4. $f(x) = (3x - 2)(-5x - 3)$
5. Factor the polynomial $10y^4 + 32y^3 - 10y^2$.

Factor the polynomial completely.

6. $42x^3 - 70x^2 + 39x - 65$

Write a quadratic equation with the given roots. Write the equation in the form $ax^2 + bx + c = 0$, where a , b , and c are integers.

7. -6 and 1

Simplify the given expression.

8. $(-4x^2 - 8x + 19) - (14x^2 + 24x - 9)$
9. $-7xy(3xy^3 - 2xy + 12y^2)$
10. Graph $f(x) = x^2 - 5x + 10$ by using a table.

Solve the equation by factoring.

11. $4x^2 + 10x + 6 = 0$
12. $x^2 + 2x - 48 = 0$

Solve the equation by completing the square.

13. $x^2 - 3x - 18 = 0$

Find the value of the discriminant. Then describe the number and type of roots for the equation.

14. $-3x^2 - 10x + 4 = 0$

Simplify.

15. $(4 + 8i)(2 - 14i)$

16. $(8 + 7i) + (8 - 16i)$

17. $\frac{6}{10 + 11i}$

18. Factor $x^3 + 4x^2 - 25x - 100$.

Solve the given equation. State the number and type of roots.

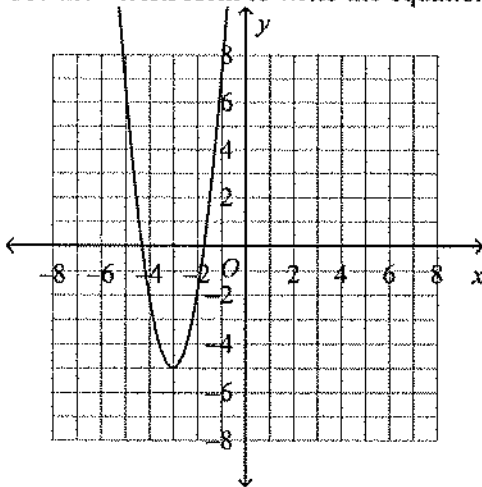
19. $x^2 - x - 20 = 0$

Find the exact solution of the following quadratic equation by using the Quadratic Formula.

20. $-x^2 + 11x + 9 = 0$

21. Factor $5x^2 + x - 4$ by guess and check.

22. Use the vertex form to write the equation of the parabola.



23. Factor $5x^2 + 28x + 15$.

Determine whether the given function has a maximum or a minimum value. Then, find the maximum or minimum value of the function.

24. $f(x) = 2x^2 - 8x + 2$

Simplify the expression using long division.

25. $(8x^2 - 33x + 4) \div (x - 4)$

26. Express $8\sqrt{-84}$ in terms of i .

27. Find the product $(5x - 3)(x^3 - 5x + 2)$.

28. Identify the degree of the monomial $-5r^3s^5$.

29. For $h(x) = 2x^2 + 6x - 9$ and $k(x) = 3x^2 - 8x + 8$, find $h(x) - 2k(x)$.

30. Find the zeros of the function $h(x) = x^2 + 23x + 60$ by factoring.

31. Factor the trinomial $m^2 + 10m + 24$.

Simplify the expression using synthetic division.

32. $(2x^3 - 18x^2 + 40x - 24) \div (x - 6)$

Midterm Review

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Factor by grouping. Assume any variable exponents represent whole numbers.

33) $x^3 + 8x - 2x^2 - 16$

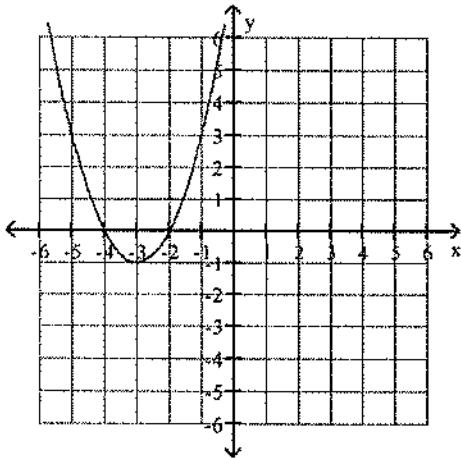
Factor using the formula for the sum or difference of two cubes.

34) $x^3 + 8$

35) $8x^3 - 125$

Use the graph to determine the function's domain and range.

36)



Simplify the radical expression. Assume that all variables represent positive real numbers.

37) $\sqrt{54x^2y}$

Determine whether the relation is a function.

38) $\{(-6, -2), (-3, 4), (-1, -6), (4, 4)\}$

Graph the function. State the domain and range of the function.

39) $f(x) = x^2 - 2$

Solve the equation by the square root property.

40) $2(x - 8)^2 = 14$

Find the indicated value.

41) Find $f(2)$ when $f(x) = 5x^2 - 3x + 3$.

Simplify.

42) $\frac{9^2 + (13 - 3)^2}{28 \div 4 - (5 + 1)}$

Find the product.

43) $(x + 5)(x + 6)$

44) $(3x - 2)^2$

Find the domain and range of the quadratic function whose graph is described.

45) The vertex is $(-1, 2)$ and the graph opens up.

Solve the equation by completing the square.

46) $x^2 - 14x + 65 = 0$

Find the vertex of the graph of the quadratic function.

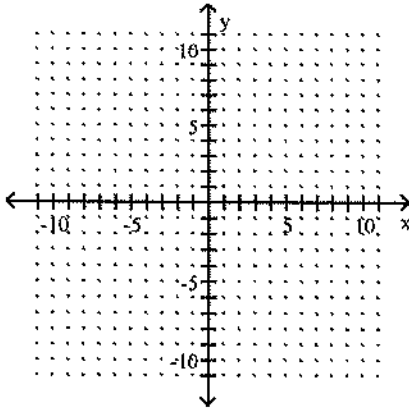
47) $f(x) = x^2 - 10x - 7$

Simplify the exponential expression.

48) $\frac{-10x^{13}y^{12}}{2x^9y^3}$

Graph the equation.

49) $-x + 8y = 24$



Simplify. Write the answer with positive exponents.

50) $\left(\frac{4x^4y^2}{z^2}\right)^4$

51) $w^6 \cdot w^7 \cdot w^5$

52) $\frac{-14x^9y^{10}}{7x^2y^4}$

Evaluate the expression or indicate that the root is not a real number.

53) $\sqrt{16} + \sqrt{9}$

Use synthetic division and the Remainder Theorem to find the indicated function value.

54) $f(x) = 2x^3 - 3x^2 - 4x + 11$; $f(-2)$

Give the domain and range of the relation.

55) $\{(9, -6), (-3, 2), (7, 6), (7, -7)\}$

Factor the trinomial, or state that the trinomial is prime.

56) $5x^2 + 24x + 27$

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Write in terms of i .

57) $\sqrt{-81}$

A) $-9i$

B) $i\sqrt{9}$

C) $9i$

D) ± 9

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Solve the equation.

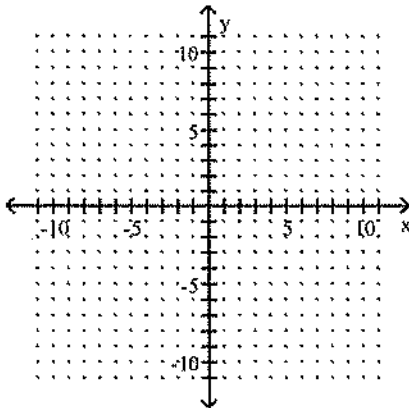
58) $-2(k - 4) - (-3k - 1) = -7$

Evaluate the piecewise function at the given value of the independent variable.

59) $f(x) = \begin{cases} -5x + 2 & \text{if } x < -2 \\ -4x + 5 & \text{if } x \geq -2 \end{cases}; f(1)$

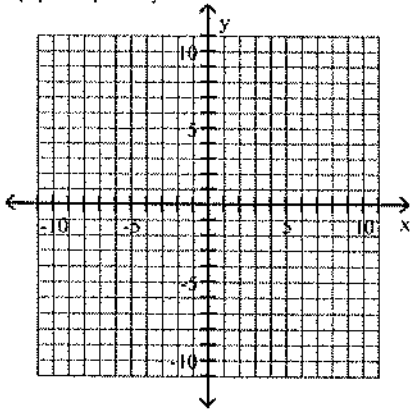
Graph the function.

60) $f(x) = -\frac{3}{7}x + 8$

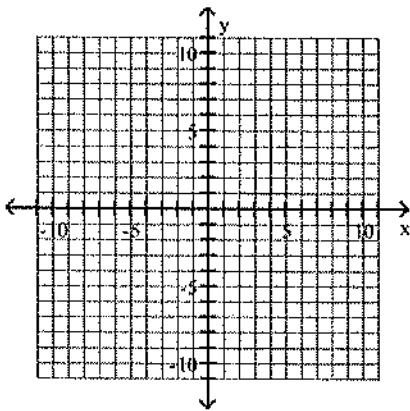


Use the vertex and intercepts to sketch the graph of the quadratic function.

61) $f(x) = 2(x + 6)^2 - 2$



62) $f(x) = -x^2 - 6x - 5$



Factor the difference of two squares.

63) $16x^2 - 169y^2$

Simplify. Use positive exponents to write the answer.

64) $(4p)^{-2}$

Graph the solution set of the inequality and write it in interval notation.

65) $\{x \mid x \leq 3\}$

Find the coordinates of the vertex for the parabola defined by the given quadratic function.

66) $f(x) = (x + 9)^2 - 8$

Determine whether the given quadratic function has a minimum value or maximum value. Then find the coordinates of the minimum or maximum point.

$$67) f(x) = x^2 - 2x - 8$$

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

Find the degree of the polynomial.

$$68) 19x^4 + 4x^3 - 6x - 5x^5 + 3$$

A) degree 3

B) degree 19

C) degree 5

D) degree 4

Find the axis of symmetry of the parabola defined by the given quadratic function.

$$69) f(x) = (x + 2)^2 + 9$$

A) $x = 2$

B) $y = 9$

C) $x = -2$

D) $y = -9$

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

Perform the indicated operations. Write the resulting polynomial in standard form.

$$70) (5x^7 + 7x^6 - 5) - (2x^7 - 18x^6 + 13)$$

Divide using synthetic division.

$$71) (x^2 + 10x + 16) \div (x + 3)$$

Determine the constant that should be added to the binomial so that it becomes a perfect square trinomial. Then write and factor the trinomial.

$$72) x^2 - 6x$$

Simplify the expression.

$$73) 2(4 - 6)^2$$

Factor out the greatest common factor.

$$74) 4x^2 - 24x$$

Solve the inequality. Write your solution in interval notation.

$$75) 3(2x - 9) - 4x > -(x + 18)$$