

Algebra 2 Honors Chapter 6 Test Review**Multiple Choice**

Identify the choice that best completes the statement or answers the question.

Write the polynomial in factored form.

- _____ 1. $x^3 + 9x^2 + 18x$
- | | |
|-----------------------|----------------------|
| a. $6x(x + 1)(x + 3)$ | c. $x(x + 6)(x - 3)$ |
| b. $3x(x + 6)(x + 1)$ | d. $x(x + 3)(x + 6)$ |

What are the real or imaginary solutions of each polynomial equation?

- _____ 2. $125x^3 + 343 = 0$
- | | |
|--|--------------------------------|
| a. $\frac{7}{5}, \frac{35 \pm 35\sqrt{3}}{50}$ | c. $-\frac{7}{5}, \frac{7}{5}$ |
| b. $-\frac{7}{5}, \frac{35 \pm 35i\sqrt{3}}{50}$ | d. no solution |
- _____ 3. $x^4 - 40x^2 + 144 = 0$
- | | |
|-------------------|----------------|
| a. $6, -6, 2, -2$ | c. $6, -6$ |
| b. $6, -2$ | d. no solution |

What are the real or imaginary solutions of the polynomial equation?

- _____ 4. $x^3 - 8 = 0$
- | | |
|---|---|
| a. $1 + i\sqrt{3}$ and $1 - i\sqrt{3}$ | c. $2, 1 + 2i\sqrt{3}$, and $1 - 2i\sqrt{3}$ |
| b. $2, 1 + i\sqrt{3}$, and $1 - i\sqrt{3}$ | d. $2, 2 + 2i\sqrt{3}$, and $2 - 2i\sqrt{3}$ |
- _____ 5. The dimensions in inches of a shipping box at We Ship 4 You can be expressed as width x , length $x + 5$, and height $3x - 1$. The volume is about 7.6 ft^3 . Find the dimensions of the box in inches. Round to the nearest inch.
- | | |
|-------------------------------|-------------------------------|
| a. 15 in. by 20 in. by 44 in. | c. 15 in. by 20 in. by 45 in. |
| b. 12 in. by 17 in. by 35 in. | d. 12 in. by 17 in. by 36 in. |

Simplify the given expression. Assume that no variable equals 0.

- _____ 6. $(19x^{-6}y^{11})(-6xy^5)$
- | | |
|---------------------------|-----------------------------|
| a. $-114x^{-5}y^{16}$ | c. $\frac{-114y^{16}}{x^5}$ |
| b. $\frac{13y^{16}}{x^5}$ | d. $-114x^{-7}y^{-24}$ |

_____ 7. $\left(\frac{32x^{18}y^{10}}{16x^9y^{20}}\right)^2$

a. $2x^9y^{20}$

c. $\frac{4x^9}{y^{10}}$

b. $\frac{4x^{18}}{y^{20}}$

d. $4x^{18}y^{-20}$

_____ 8. Find $p(-3)$ and $p(5)$ for the function $p(x) = 4x^4 + 8x^3 - 2x^2 + 13x + 10$.

a. 51; 3,515

c. -371; 1,525

b. 61; 3,525

d. 113; 3,473

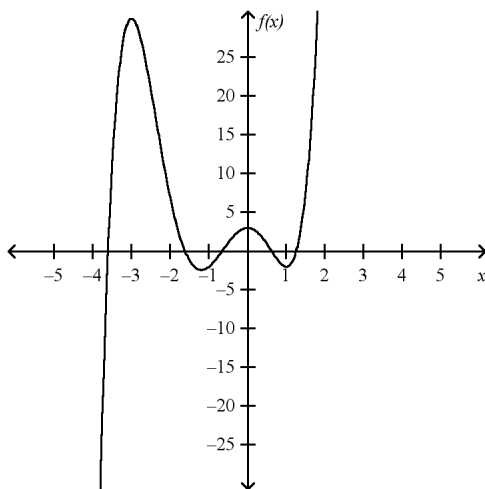
For the given graph,

a. describe the end behavior,

b. determine whether it represents an odd-degree or even-degree polynomial function, and

c. state the number of real zeros.

_____ 9.



- The end behavior of the graph is $f(x) \rightarrow +\infty$ as $x \rightarrow +\infty$ and $f(x) \rightarrow +\infty$ as $x \rightarrow -\infty$.
It is an odd-degree polynomial function.
The function has five real zeros.
- The end behavior of the graph is $f(x) \rightarrow +\infty$ as $x \rightarrow +\infty$ and $f(x) \rightarrow -\infty$ as $x \rightarrow -\infty$.
It is an odd-degree polynomial function.
The function has five real zeros.
- The end behavior of the graph is $f(x) \rightarrow +\infty$ as $x \rightarrow +\infty$ and $f(x) \rightarrow -\infty$ as $x \rightarrow -\infty$.
It is an odd-degree polynomial function.
The function has four real zeros.
- The end behavior of the graph is $f(x) \rightarrow +\infty$ as $x \rightarrow +\infty$ and $f(x) \rightarrow -\infty$ as $x \rightarrow -\infty$.
It is an even-degree polynomial function.
The function has five real zeros.

For the given function, determine consecutive values of x between which each real zero is located.

- _____ 10. $f(x) = -2x^4 - 4x^3 - 2x^2 + 3x + 8$
- There is a zero between $x = 1$ and $x = 2$.
 - There are zeros between $x = 2$ and $x = 3$, $x = 1$ and $x = 0$, $x = -2$ and $x = -3$.
 - There are zeros between $x = 1$ and $x = 2$, $x = -1$ and $x = -2$.
 - There is a zero between $x = -1$ and $x = -2$.

Estimate the x -coordinates at which the relative maxima and relative minima occur for the function.

- _____ 11. $f(x) = 8x^3 + 2x^2 - 8$
- The relative maximum is at $x = -0.17$, and the relative minimum is at $x = 1$.
 - The relative maximum is at $x = 0.17$, and the relative minimum is at $x = 0$.
 - The relative maximum is at $x = 0.17$, and the relative minimum is at $x = 1$.
 - The relative maximum is at $x = -0.17$, and the relative minimum is at $x = 0$.

Factor the polynomial completely.

- _____ 12. $5x^4y - 10x^2y^2$
- $5x^2y(x^2 - 2y)$
 - $5x^2(x^2y - 2y^2)$
 - $x^2y(5x^2 - 10y)$
 - $5(x^4y - 2x^2y^2)$
- _____ 13. $2xy - 3y - 32x + 48$
- $(y - 16)(2x - 3)$
 - $y(2x - 3) - 32x + 48$
 - $(2xy - 3y) - (32x - 48)$
 - $y(2x - 3) - 16(2x - 3)$
- _____ 14. $4x^2 - 13x + 9$
- $4x^2 - 4x - 9x + 9$
 - $4x^2 - 3x - 10x + 9$
 - $4x(x - 1) - 9(x - 1)$
 - $(4x - 9)(x - 1)$
- _____ 15. $10x^2 - 29x + 18$
- $10x(x - 2) - 9(x - 2)$
 - $(10x - 9)(x - 2)$
 - $10x^2 - 20x - 9x + 18$
 - $10x^2 - 19x - 10x + 18$
- _____ 16. $20x^2 + 12x - 11$
- $(2x + 1)(10x - 11)$
 - $(2x - 1)(10x + 11)$
 - $(2x + 1)(10x + 11)$
 - $(2x - 1)(10x - 11)$
- _____ 17. Use synthetic substitution to find $g(2)$ and $g(-8)$ for the function $g(x) = x^5 - 7x^3 - 9x + 10$.
- $-32, -29, 102$
 - $80, 29, 122$
 - $4, -29, 246$
 - $-48, 7, 762$

Algebra 2 Honors Chapter 6 Test Review Answer Section

MULTIPLE CHOICE

1. ANS: D PTS: 1 DIF: L2
REF: 5-2 Polynomials, Linear Factors, and Zeros
OBJ: 5-2.1 To analyze the factored form of a polynomial
STA: MA.912.A.4.3| MA.912.A.4.5| MA.912.A.4.7| MA.912.A.4.8
TOP: 5-2 Problem 1 Writing a Polynomial in Factored Form
KEY: DOK: DOK 2
2. ANS: B PTS: 1 DIF: L3 REF: 5-3 Solving Polynomial Equations
OBJ: 5-3.1 To solve polynomial equations by factoring
STA: MA.912.A.4.3| MA.912.A.4.5| MA.912.A.4.9| MA.912.A.4.10
TOP: 5-3 Problem 1 Solving Polynomial Equations Using Factors
KEY: factoring a polynomial | polynomial function DOK: DOK 2
3. ANS: A PTS: 1 DIF: L2 REF: 5-3 Solving Polynomial Equations
OBJ: 5-3.1 To solve polynomial equations by factoring
STA: MA.912.A.4.3| MA.912.A.4.5| MA.912.A.4.9| MA.912.A.4.10
TOP: 5-3 Problem 1 Solving Polynomial Equations Using Factors
KEY: DOK: DOK 2
4. ANS: B PTS: 1 DIF: L2 REF: 5-3 Solving Polynomial Equations
OBJ: 5-3.1 To solve polynomial equations by factoring
STA: MA.912.A.4.3| MA.912.A.4.5| MA.912.A.4.9| MA.912.A.4.10
TOP: 5-3 Problem 2 Solving Polynomial Equations by Factoring
KEY: sum of cubes | difference of cubes DOK: DOK 2
5. ANS: A PTS: 1 DIF: L3 REF: 5-3 Solving Polynomial Equations
OBJ: 5-3.2 To solve polynomial equations by graphing
STA: MA.912.A.4.3| MA.912.A.4.5| MA.912.A.4.9| MA.912.A.4.10
TOP: 5-3 Problem 4 Modeling a Problem Situation DOK: DOK 3
6. ANS: C
Multiply the constants and then multiply the powers using the Power of a Product Property.

	Feedback
A	A simplified expression cannot contain negative exponents.
B	Multiply the constants.
C	Correct!
D	Multiply the powers of the same variable using the Power of a Product Property.

- PTS: 1 DIF: Basic REF: Lesson 6-1
OBJ: 6-1.1 Use properties of exponents to multiply monomials.
STA: MA.912.A.4.2 TOP: Use properties of exponents to multiply monomials.
KEY: Monomials | Multiply Monomials

7. ANS: B

Simplify each base using the properties of powers. Then, write all the fractions in the simplest terms and ensure there are no negative exponents.

	Feedback
A	Use the Power of a Power Property to all the terms in the monomial.
B	Correct!
C	Raise the numerator and the denominator to the second power before simplifying.
D	There should be no negative exponents.

PTS: 1

DIF: Average

REF: Lesson 6-1

OBJ: 6-1.2 Use properties of exponents to divide monomials.

STA: MA.912.A.4.2

TOP: Use properties of exponents to divide monomials.

KEY: Monomials | Divide Monomials

8. ANS: B

Replace the values of $p(x)$ with $p(-3)$ and simplify.

	Feedback
A	Add the value of the constant.
B	Correct!
C	The exponent value of the first term is 4, not 3.
D	Did you substitute the correct values in the function?

PTS: 1

DIF: Average

REF: Lesson 6-3

OBJ: 6-3.1 Evaluate polynomial functions.

STA: MA.912.A.4.5

TOP: Evaluate polynomial functions. KEY: Polynomial Functions

9. ANS: B

The end behavior is the behavior of the graph as x approaches positive infinity ($+\infty$) or negative infinity ($-\infty$). The x -coordinate of the point at which the graph intersects the x -axis is called the *zero* of the function.

	Feedback
A	What is the end behavior of the graph?
B	Correct!
C	Did you verify the number of real zeros?
D	Check the degree of the polynomial function.

PTS: 1

DIF: Basic

REF: Lesson 6-3

OBJ: 6-3.2 Identify general shapes of graphs of polynomial functions.

STA: MA.912.A.4.5

TOP: Identify general shapes of graphs of polynomial functions.

KEY: Polynomial Functions | Graph Polynomial Functions

10. ANS: C

Make a table of values to obtain the required answer.

	Feedback
A	Did you locate all the real zeros?
B	Does the sign of the polynomial change between these consecutive values?
C	Correct!
D	You have obtained only some of the real zeros.

PTS: 1

DIF: Advanced

REF: Lesson 6-4

OBJ: 6-4.2 Locate real zeros of polynomial functions.

STA: MA.912.A.2.6 | MA.912.A.4.5

TOP: Locate real zeros of polynomial functions.

KEY: Polynomial Functions | Zeroes of Polynomial Functions

11. ANS: D

Make a table of values and graph the equation.

	Feedback
A	A relative minimum is a point that has no nearby points with a lesser y -coordinate.
B	Did you obtain the correct value of the relative maximum?
C	Did you find the correct coordinates of the function?
D	Correct!

PTS: 1

DIF: Average

REF: Lesson 6-4

OBJ: 6-4.3 Find the maxima and minima of polynomial functions.

STA: MA.912.A.2.6 | MA.912.A.4.5

TOP: Find the maxima and minima of polynomial functions.

KEY: Maxima of Polynomial Functions | Minima of Polynomial Functions

12. ANS: A

Find the GCF (greatest common factor) of the monomials in the given polynomial, and use it in grouping the polynomial.

	Feedback
A	Correct!
B	Take the GCF of the monomials using all the terms given in it.
C	Take the GCF of the whole numbers in the monomials.
D	Take the GCF using the monomials in the given polynomial and not just the whole numbers.

PTS: 1

DIF: Average

REF: Lesson 6-5

OBJ: 6-5.1 Factor polynomials with the GCF.

STA: MA.912.A.4.3

TOP: Factor polynomials with the GCF.

KEY: Polynomials | Factor Polynomials | GCF

13. ANS: A

Group the monomials to find the GCF (greatest common factor), factor the GCF of each binomial, and then use the Distributive Property to obtain the factors.

	Feedback
A	Correct!
B	Group the polynomial into binomials to find the GCF.
C	Factor the GCF of each binomial.
D	Use the Distributive Property.

PTS: 1

DIF: Average

REF: Lesson 6-5

OBJ: 6-5.2 Factor polynomials by grouping.

STA: MA.912.A.4.3

TOP: Factor polynomials by grouping. KEY: Polynomials | Factor Polynomials

14. ANS: D

To find the coefficient of the x terms, find two numbers whose product is $4 \cdot 9$ or 36 and whose sum is 13.

	Feedback
A	Factor the GCF of each group.
B	The product of the coefficient of the x terms should be equal to the product of the coefficient of the x^2 term and the constant term.
C	Use the Distributive Property to obtain two binomial factors.
D	Correct!

PTS: 1

DIF: Advanced

REF: Lesson 6-5

OBJ: 6-5.3 Factor polynomials with addition recognizing the FOIL method.

STA: MA.912.A.4.3

TOP: Factor polynomials with addition by recognizing the FOIL method.

KEY: Polynomials | Factor Polynomials | FOIL Method

15. ANS: B

To find the coefficient of the x terms, find two numbers whose product is $10 \cdot 18$ or 180 and whose sum is 29.

	Feedback
A	Use the Distributive Property to obtain two binomial factors.
B	Correct!
C	Factor the GCF of each group.
D	The product of the coefficient of the x terms should be equal to the product of the coefficient of the x^2 term and the constant term.

PTS: 1

DIF: Average

REF: Lesson 6-5

OBJ: 6-5.3 Factor polynomials with addition recognizing the FOIL method.

STA: MA.912.A.4.3

TOP: Factor polynomials with addition by recognizing the FOIL method.

KEY: Polynomials | Factor Polynomials | FOIL Method

16. ANS: B

To find the coefficient of the x terms, find two numbers such that their product is $20 \cdot 11$ or 220 and their difference is 12.

	Feedback
A	Rewrite the coefficients of the x term in two parts such that their difference is equal to the x coefficient in the original expression.
B	Correct!
C	Use the Distributive Property to obtain two binomial factors.
D	Rewrite the coefficients of the x term in two parts such that their product is equal to the product of the coefficient of the x^2 term and the constant.

PTS: 1

DIF: Average

REF: Lesson 6-5

OBJ: 6-5.4 Factor polynomials with subtraction recognizing the FOIL method.

STA: MA.912.A.4.3

TOP: Factor polynomials with subtraction recognizing the FOIL method.

KEY: Polynomials | Factor Polynomials | FOIL Method

17. ANS: A

Use synthetic substitution to obtain the required answer.

	Feedback
A	Correct!
B	Did you substitute the correct values?
C	Did you calculate correctly?
D	The degree of the function is 5, not 4.

PTS: 1

DIF: Advanced

REF: Lesson 6-6

OBJ: 6-6.1 Evaluate functions using synthetic substitution.

STA: MA.912.A.4.6 | MA.912.A.4.8 | MA.912.A.4.3

TOP: Evaluate functions using synthetic substitution.

KEY: Polynomial Functions | Synthetic Substitution

18. ANS: A

Use the Factor Theorem.

	Feedback
A	Correct!
B	You have to factor the depressed polynomial to its simplest form.
C	Did you factor correctly?
D	Did you verify the answer by multiplying the factors?

PTS: 1

DIF: Advanced

REF: Lesson 6-6

OBJ: 6-6.2 Determine whether a binomial is a factor of a polynomial by using synthetic substitution.

STA: MA.912.A.4.6 | MA.912.A.4.8 | MA.912.A.4.3

TOP: Determine whether a binomial is a factor of a polynomial by using synthetic substitution.

KEY: Polynomial Functions | Synthetic Substitution

19. ANS: A

Use synthetic substitution to obtain the required answer.

	Feedback
A	Correct!
B	The function also has a positive real zero.
C	Find all the possible imaginary zeros.
D	There is no change in sign for the coefficients of $f(-x)$.

PTS: 1

DIF: Average

REF: Lesson 6-7

OBJ: 6-7.2 Find the zeros of a polynomial function.

STA: MA.912.A.4.6 | MA.912.A.4.8 | MA.912.A.4.3 | MA.912.A.4.7

TOP: Find the zeros of a polynomial function.

KEY: Polynomial Functions | Zeroes of Polynomial Functions

20. ANS: D

Use synthetic substitution to obtain the required answer.

	Feedback
A	There is no change in sign for the coefficients of $f(-x)$.
B	Did you find all the zeros of the function?
C	The function has no negative real zeros.
D	Correct!

PTS: 1

DIF: Average

REF: Lesson 6-7

OBJ: 6-7.2 Find the zeros of a polynomial function.

STA: MA.912.A.4.6 | MA.912.A.4.8 | MA.912.A.4.3 | MA.912.A.4.7

TOP: Find the zeros of a polynomial function.

KEY: Polynomial Functions | Zeroes of Polynomial Functions

21. ANS: A

Use the Rational Zero Theorem.

	Feedback
A	Correct!
B	You have missed some of the negative real zeros.
C	Did you consider the negative rational zeros?
D	You must also include the positive rational zeros in the answer.

PTS: 1

DIF: Average

REF: Lesson 6-8

OBJ: 6-8.1 Identify the possible rational zeros of a polynomial function.

STA: MA.912.A.4.6 | MA.912.A.4.8 | MA.912.A.4.3

TOP: Identify the possible rational zeros of a polynomial function.

KEY: Polynomial Functions | Zeroes of Polynomial Functions

22. ANS: D

Use the Rational Zero Theorem.

	Feedback
A	Did you consider the negative rational zeros?
B	You must also include the positive rational zeros in the answer.
C	Did you calculate all the zeros correctly?
D	Correct!

PTS: 1

DIF: Average

REF: Lesson 6-8

OBJ: 6-8.1 Identify the possible rational zeros of a polynomial function.

STA: MA.912.A.4.6 | MA.912.A.4.8 | MA.912.A.4.3

TOP: Identify the possible rational zeros of a polynomial function.

KEY: Polynomial Functions | Zeroes of Polynomial Functions

23. ANS: B

Use the Rational Zero Theorem.

	Feedback
A	Did you apply the Rational Zero Theorem correctly?
B	Correct!
C	Did you verify the answer by substituting the values of the rational zeros?
D	Did you correctly?

PTS: 1

DIF: Average

REF: Lesson 6-8

OBJ: 6-8.2 Find all the rational zeros of a polynomial function.

STA: MA.912.A.4.6 | MA.912.A.4.8 | MA.912.A.4.3

TOP: Find all the rational zeros of a polynomial function.

KEY: Polynomial Functions | Zeroes of Polynomial Functions