

Module Test **A**

Module 12

Fill in the blanks with the terms that best complete each statement.

1. **Factoring** _____ a polynomial is rewriting the polynomial as the product of simpler expressions.
2. The product of conjugates is also called the product of the **sum and difference** _____.
3. The constants in the binomial factors of the trinomial $x^2 + bx + c$ must have a **product** _____ of c and a **sum** _____ of b .
4. A polynomial is factored **completely** _____ when each factor is either a monomial or a prime polynomial.

Are the following statements true or false?

- | | |
|--|---|
| 5. When factoring a polynomial, the first thing to be done is to factor out the greatest common factor if there is one. True _____ | 6. The common factor of a polynomial expression can be a monomial. True _____ |
| 7. When factoring by grouping, the terms of the polynomial never have to be rearranged. False _____ | 8. For any real a and b , $a^2 + b^2$ can be factored. False _____ |
| 9. $(2x - y)$ and $(x + y)$ are conjugates. False _____ | 10. The factorization of $a^2 - 2ab + b^2$ is $(a + b)(a - b)$. False _____ |
| 11. A polynomial may require factoring by more than one method. True _____ | 12. $\frac{x - 5}{5}$ is equivalent to x . False _____ |

Choose the best response to each of the following:

13. According to the Distributive Property, $a(b + c) =$
 a. $ab + c$ **b.** $ab + ac$ c. $b + ac$ d. abc
14. Factoring the Difference of Two Squares is the reverse of the
 a. Distributive Property b. FOIL Method
c. Product of Conjugates d. Grouping Method
15. Factoring by grouping is the reverse of the
a. Distributive Property b. FOIL Method
 c. Product of Conjugates d. *Guess-and-check* Method
16. Find the greatest common monomial factor of $4x^2 - 7x^5$.
 a. x **b.** x^2 c. x^5 d. There is no common factor.
17. Find the greatest common monomial factor of $9x^3 + 6xy^2 - 4y$.
 a. $2y$ b. $3x$ c. $6xy^2$ **d.** There is no common factor.
18. Which of the following **cannot** be factored by grouping?
a. $x^2 + 9$ b. $3x^2 + x - 10$ c. $ar + as + br + bs$ d. $9y + 3y^2 - 30$
19. When grouped, $5b + 5c - ab - ac$ can be correctly written as
 a. $(5b + 5c) + (ab + ac)$ b. $(5b + 5c) - (ab - ac)$ **c.** $(5b + 5c) - (ab + ac)$
20. Given that the factors of $x^2 + bx + c$ are $(x + r)(x + s)$, if $b < 0$ and $c > 0$, then
 a. $r > 0, s > 0$ b. either $r < 0, s > 0$ or $r > 0, s < 0$ **c.** $r < 0, s < 0$

21. Factor, if possible.

- | | | |
|---|---|---|
| a. $16p + 8$ <u>$8(2p + 1)$</u> | b. $8x^2 - 6x - 5$ <u>$(4x - 5)(2x + 1)$</u> | c. $q^2 - 144$ <u>$(q + 12)(q - 12)$</u> |
| d. $y^2 + 11y + 10$ <u>$(y + 1)(y + 10)$</u> | e. $4x^3y^2 - 6x^4y + 8x^3y^3$ <u>$2x^3y(2y - 3x + 4y^2)$</u> | f. $25 - a^2$ <u>$(5 + a)(5 - a)$</u> |
| g. $a^2 + ab - 4a - 4b$ <u>$(a + b)(a - 4)$</u> | h. $n^2 - n - 42$ <u>$(n + 6)(n - 7)$</u> | i. $6w^2 + 13w + 6$ <u>$(3w + 2)(2w + 3)$</u> |
| j. $x^2 + 81$ <u>prime</u> | k. $6y^2 + 7y - 10$ <u>$(6y - 5)(y + 2)$</u> | l. $3a^2 + 6a - 4$ <u>prime</u> |

22. Factor completely.

a. $x^3 - 7x^2 - 4x + 28$ $(x - 7)(x + 2)(x - 2)$

b. $5a^4 - 80$ $5(a^2 + 4)(a + 2)(a - 2)$

c. $3x^3 - 24x^2 + 36x$ $3x(x - 2)(x - 6)$

d. $24y^3 - 54y$ $6y(2y + 3)(2y - 3)$

23. Divide by factoring.

a. $\frac{x^2 - 49}{x + 7}$ $x - 7$

b. $\frac{6p^2 - 11p - 10}{3p + 2}$ $\frac{2p - 5}{q + 4}$

c. $\frac{3y^2 - 9y + 6}{3y - 3}$ $y - 2$

d. $\frac{q^2 + 10q + 24}{2q + 12}$ $\frac{q + 4}{2}$

Answer the following questions.

24. List the three steps, in the correct order, for factoring by grouping.

To factor by grouping, form groups so that each group has a common factor, factor the greatest common monomial factor out of each group, and factor out the greatest common binomial factor from the resulting terms.

25. List the types of factoring studied in this module. Briefly describe how a candidate for each type of factoring would be recognized.

The types of factoring and points of recognition are:

- Greatest Common Factor; any common factors in polynomial of any size
- Grouping; four-term polynomial or quadratic trinomial that can be rewritten as a four-term polynomial
- Difference of Two Squares; binomial with one perfect square subtracted from another perfect square
- Factor Pair List; quadratic trinomial
- Guess-and-check; quadratic trinomial

