

Module Test **B**

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 any polynomial, the first thing to be done is to group terms with common factors.
False _____ | 6. The common factor of a polynomial expression can be a binomial.
True _____ |
| 7. When factoring by grouping, the terms of the polynomial may have to be rearranged.
True _____ | 8. For any real a and b , $a^2 - b^2$ cannot be factored.
False _____ |
| 9. $(a + b)$ and $(b - a)$ are conjugates.
True _____ | 10. The factorization of $a^2 - b^2$ is $(a - b)^2$.
False _____ |
| 11. A polynomial is called prime only after it is determined that the polynomial cannot be factored by any method.
True _____ | 12. $\frac{x+3}{3}$ is equivalent to $x + 1$.
False _____ |

Choose the correct response to each of the following:

13. According to the Distributive Property, $a(b + c) =$

- a. $a + b + c$ b. $ab + c$ c. $b + ac$ **d. $ab + ac$**

14. Factoring out the greatest common factor is the reverse of the

- a. Distributive Property** b. FOIL Method c. Product of Conjugates

15. Factoring a quadratic trinomial is the reverse of the

- a. Distributive Property **b. FOIL Method** c. Product of Conjugates

16. Find the greatest common monomial factor of $12x^5 - 18y^3$.

- a. 6** b. 2 c. 3 d. There is no common factor.

17. Find the greatest common monomial factor of $a^2 + b^2$.

- a. a^2 b. b^2 c. $(ab)^2$ **d. There is no common factor.**

18. Which of the following **cannot** be factored by grouping?

- a. $n^2 - 42 - n$ b. $10 - xy - 2y + 5x$
c. $x^2 + 25$ d. $8d^2 + 10d - 25$

19. When grouped, $xy - 2x - 3y + 6$ can be correctly written as

- a. $(xy - 2x) - (3y + 6)$ b. $(xy - 2x) + (3y - 6)$
c. $(xy - 2x) - (3y - 6)$ d. $(xy - 2x) + (-3y - 6)$

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. $18c - 6$

$6(3c - 1)$

b. $12y^2 + y - 6$

$(4y + 3)(3y - 2)$

c. $r^2 - 1$

$(r + 1)(r - 1)$

d. $x^2 + 6x + 8$

$(x + 2)(x + 4)$

e. $7x^2y^4 + 5x^3y^2 + 2x^2y^3$

$x^2y^2(7y^2 + 5x - 2y)$

f. $36 - b^2$

$(6 + b)(6 - b)$

g. $ab + 2b - a - 2$

$(a + 2)(b - 1)$

h. $m^2 + 13m - 30$

$(m - 2)(m + 15)$

i. $8t^2 - 22t + 15$

$(2t - 3)(4t - 5)$

j. $y^2 + 49$

Prime

k. $4x^2 - 3x - 22$

$(4x - 11)(x + 2)$

l. $b^2 - c^2$

$(b + c)(b - c)$

22. Factor completely.

a. $x^3 + 5x^2 - 9x - 45$ $(x + 5)(x + 3)(x - 3)$

b. $2b^5 - 162b$ $2b(b^2 + 9)(b + 3)(b - 3)$

c. $a^3b + 2a^2b^2 + ab^3$ $ab(a + b)^2$

d. $25y^5 - y^3$ $y^3(5y + 1)(5y - 1)$

23. Divide by factoring.

a. $\frac{y^2 - 16}{y + 4}$ $y - 4$

b. $\frac{4x^2 + 5x - 6}{4x - 3}$ $x + 2$

c. $\frac{8k^2 - 14k + 3}{8k - 12}$ $\frac{4k - 1}{4}$

d. $\frac{m^2 - 8m + 15}{5m - 15}$ $\frac{m - 5}{5}$

Answer the following questions.

24. Explain how a quadratic trinomial can be rewritten as a four-term polynomial so that it may be factored by grouping.

Multiply the leading coefficient and constant. List the factor pairs for this product. Choose the factor pair whose sum is the same as the coefficient of the middle term in the trinomial. Then replace the middle term by two terms with the same variable as the middle term but having the chosen factor pair as coefficients.

25. List, in the correct order, the four steps of the *guess-and-check* method for factoring quadratic trinomials. Explain when this method might not be the most efficient process for factoring this type of trinomial.

To factor a quadratic trinomial using the guess-and-check method, first guess factors of the first term and place as first terms in each binomial. Next, guess factors of the last term and place as last terms in each binomial. Then, check by finding the binomial product using the FOIL Method. Repeat steps, if needed, until original polynomial is obtained. When the first and/or the last terms of the trinomial have several factors, the guess-and-check method may not be the most efficient way to factor this type of polynomial.

