

Factoring Polynomials

Unit 9 Test Review

1. Write the prime factorization of 36.

$$2 \cdot 2 \cdot 3 \cdot 3$$

Find the GCF.

2. 8 and 28

$$4$$

3. $6x^2$ and $18x^5$

$$6x^2$$

4. Marlon is putting his stamp collection in a new album. He has 20 stamps from Canada and 90 stamps from the U.S. Each page of the album will have the same number of stamps, but stamps from Canada and the U.S. will not appear on the same page. If he puts the greatest possible number of stamps on each page, how many pages will he use?

GCF $\rightarrow 10 = 2$ pages Canada
 $= 9$ pages US
11 pages

Factor.

5. $\frac{30y^3}{10y} - \frac{50y}{10y}$

$$10y(3y^2 - 5)$$

6. $\frac{n(n-3)}{n-3} + \frac{8(n-3)}{n-3}$

$$(n-3)(n+8)$$

7. Factor $(a^3 - 5a^2) + (2a - 10)$ by grouping.

$$a^2(a-5) + 2(a-5)$$

$$(a-5)(a^2+2)$$

Factor each trinomial.

8. $x^2 + 10x + 21$

$$(x+7)(x+3)$$

9. $x^2 - 3x - 10$

$$(x-5)(x+2)$$

10. $x^2 + 16x - 55$

Not factorable
 ~~$(x-5)(x+11)$~~

11. Find an integer value of b that makes $x^2 + bx - 15$ factorable, and then factor the trinomial.

$(x-5)(x+3)$
 $x^2 - 5x + 3x - 15$
 $x^2 - 2x - 15$
 $b = -2$

multiple answers
 $b = 2, b = -14, b = 14$

12. Write the polynomial modeled by this geometric diagram and then factor.

x^2	$10x$
$2x$	20

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Factor each trinomial.

13. $7x^2 + 29x + 4$

$(7x + 1)(x + 4)$

14. $3a^2 - 4a - 7$

$(3a - 7)(a + 1)$

15. Determine whether each value of c makes $3x^2 + 7x + c$ factorable. If so, factor it.

~~$c = -2$~~

~~$c = 2$~~

Determine whether the trinomial is a perfect square. If so, factor it. If not, explain why.

16. $n^2 + 50n + 25$

$n^2 \downarrow 5^2$

$2(n)(5)$

$10n \neq$

NO!

the middle term doesn't work.

17. $x^2 - 18x + 81$

$x^2 \downarrow 9^2$

$2(x)(9) = 18x$

Yes!

$(x - 9)(x - 9)$

Determine whether the binomial is a difference of two squares. If so, factor it. If not, explain why.

18. $p^2 - 30$

NO! 30 not

a perfect squares

19. $x^2 - 100$

$x^2 - 10^2$

$(x - 10)(x + 10)$

20. The area of a square in square feet is represented by $z^2 + 12z + 36$. Find an expression for the perimeter of the square. Then find the perimeter when $z = 4$ ft.

expression: _____

perimeter when $z = 4$ ft: _____

21. Tell whether $(8x - 5)(4x + 12)$ is completely factored. If not, factor it.

NO! $(8x - 5) \left(\frac{4x + 12}{4} \right)$

$4(x + 3)(8x - 5)$

Factor each polynomial completely.

22. $5x^3 + 40x^2 - 100x$

$5x(x^2 + 8x - 20)$

$5x(x + 10)(x - 2)$

23. $3m^4 - 48$

$3(m^4 - 16)$

$3(m^2 - 4)(m^2 + 4)$

$3(m - 2)(m + 2)(m^2 + 4)$

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1. Write the prime factorization of 176.

$$2 \cdot 2 \cdot 2 \cdot 2 \cdot 11$$

$$\begin{array}{c} \diagup \quad \diagdown \\ 2 \quad 88 \\ \quad \quad \diagup \quad \diagdown \\ \quad \quad 8 \quad 11 \end{array}$$

Find the GCF.

2. 54 and 144

$$18$$

$$\begin{array}{c} \diagup \quad \diagdown \\ 2 \quad 4 \\ \quad \quad \diagup \quad \diagdown \\ \quad \quad 2 \quad 2 \end{array}$$

3. $30x^2$ and $66x^5$

$$6x^2$$

4. Mrs. Mendoza is organizing seating for a standardized test. 45 ninth-grade students and 120 tenth-grade students will take the test. Each row will have the same number of students, but ninth-graders and tenth-graders will not be seated in the same row. If she puts the greatest possible number of students in each row, how many rows will there be?

$$\text{GCF} \rightarrow 15 \quad \begin{array}{l} - 3 \text{ rows} \\ - 8 \text{ rows} \end{array}$$

$$11 \text{ rows}$$

Factor.

5. $14y^3 + 28y^2 - 54y$

$$2y(7y^2 + 14y - 27)$$

6. $n(2n + 3) + 4(2n - 3)$

Not factorable

7. Factor $(15a^3 + 20a^2)(6a - 8)$ by grouping.

$$5a^2(3a + 4) - 2(3a + 4)$$

$$(3a + 4)(5a^2 - 2)$$

Factor each trinomial.

8. $x^2 + 9x + 18$

$$(x + 6)(x + 3)$$

9. $x^2 + 7x - 30$

$$(x + 10)(x - 3)$$

10. $x^2 - 5x - 50$

$$(x - 10)(x + 5)$$

11. Find an integer value of b that makes $x^2 + bx + 42$ factorable, and then factor the trinomial.

$$(x + 7)(x + 6)$$

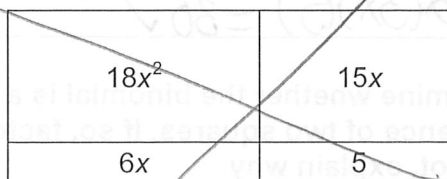
$$x^2 + 7x + 6x + 42$$

$$x^2 + 13x + 42$$

$$b = 13$$

multiple answers $b = 23$ $b = 43$

12. Write the polynomial modeled by this geometric diagram and then factor.



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Factor each trinomial.

13. $3x^2 + 47x + 140$

$(3x + 35)(x + 4)$

14. $27a^2 + 42a - 5$

$(9a - 1)(3a + 5)$

15. Determine whether each value of c makes $5x^2 - 22x + c$ factorable. If so, factor it.

~~$c = -15$~~

~~$c = 4$~~

~~$c = 8$~~

Determine whether the trinomial is a perfect square. If so, factor it. If not, explain why.

16. $n^2 + 72n + 36$

$n^2 \downarrow 6^2$ NO!

$2(n)(6) \neq 72n$

17. $9x^2 - 30x + 25$

$(3x)^2 \quad 5^2 \quad \text{Yes!} \quad (3x - 5)^2$

$2(3x)(5) = 30 \checkmark$

Determine whether the binomial is a difference of two squares. If so, factor it. If not, explain why.

18. $p^2 - 132$

No! 132 is
not a square

19. $16x^2 - 49$

$(4x - 7)(4x + 7)$

20. The area of a square in square feet is represented by $4z^2 - 36z + 81$. Find an expression for the perimeter of the square. Then find the perimeter when $z = 10$ ft.

expression: _____

perimeter when $z = 10$ ft: _____

21. Tell whether $x(4x^2 + 19x + 12)$ is completely factored. If not, factor it.

$x(4x^2 + 19x + 12)$

NO! $x(4x + 3)(x + 4)$

Factor each polynomial completely.

22. $\frac{4x^5}{2x^3} - \frac{30x^4}{2x^3} - \frac{16x^3}{2x^3}$

$2x^3(2x^2 - 15x - 8)$
 $2x^3(2x + 1)(x - 8)$

23. $(2m^3 + 3m^2) + (18m - 27)$

$m^2(2m + 3) + -9(2m + 3)$
 $(2m + 3)(m^2 - 9)$