

Math 2 Unit 9 Worksheet 1
Polynomials

Name: _____
Date: _____ **Per:** _____

[1-6] Write the following polynomials in standard form. Then name each polynomial based on degree and number of terms.

1. $2x - 6x^2 - 7$

2. $2x^5 + 9x^5$

3. $-5 + 2x$

4. $3x^3 - 7x^2 + 8$

5. $4x + x^2$

6. $-12xy^2$

[7-17] Simplify each expression.

7. $5x + 5x$

8. $7y - 3y$

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

10. $4x^3 - 12x^3$

11. $(7x + 9) + (3x - 5)$

12. $(4x - 7) - (x + 2)$

13. $(10x + 3y) - (2x + 9y)$

14. $(x + 7y) + (2x - 12y)$

15. $(3x^2 + 7x - 8) + (5x^2 - 4x + 8)$

16. $(y^3 - 4y^2 - 2) - (6y^3 + 4 - 6y^2)$

17. $(-9r^3 + 2r - 1) - (-5r^2 + r + 8)$

[18-26] Simplify each product.

18. $3w(w + 2)$

19. $(z + 5)2z$

20. $3m^2(4 + m)$

21. $2p(p^2 - 6p + 1)$

22. $-y(5y^3 - 3y^2 + 2y)$

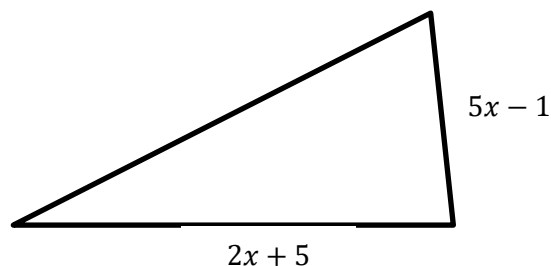
23. $3a(-3a^2 + 2a - 7)$

24. $6x^3(3x^2 - x + 10)$

25. $-4h(-h^3 - 8h^2 + 2h)$

26. $4n(n^2 + 5n + 6)$

27. The perimeter of a triangular park is $16x + 3$. What is the missing length?



28. The perimeter of a quadrilateral is $39a - 7$. Three sides have the following lengths: $9a$, $5a + 1$, and $17a - 6$. What is the length of the fourth side?

29. Compare polynomial and radical expressions.

A. Polynomial Expressions

a) $3x + 5x =$ _____

b) $3x + 5y =$ _____

c) $3x \cdot 5x =$ _____

d) $3x \cdot 5y =$ _____

Radical Expressions

e) $3\sqrt{2} + 5\sqrt{2} =$ _____

f) $3\sqrt{7} + 5\sqrt{2} =$ _____

g) $3\sqrt{7} \cdot 5\sqrt{7} =$ _____

h) $3\sqrt{7} \cdot 5\sqrt{2} =$ _____

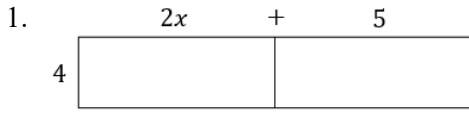
B. How are the rules for adding polynomial expressions similar to those for adding radical expressions?

C. How are the rules for multiplying polynomial expressions similar to those for multiplying radical expressions?

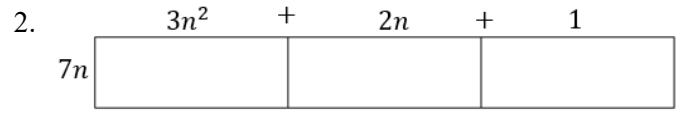
Math 2 Unit 9 Worksheet 2
Multiplying Polynomials

Name: _____
 Date: _____ Per: _____

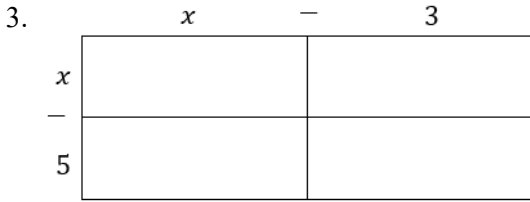
[1-4] **Area Model.** Multiply using the area model. Write the problem being modeled and your solution on the line below.



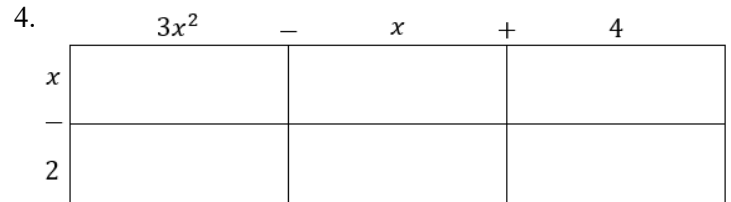
_____ = _____



_____ = _____



_____ = _____



_____ = _____

[5-28] Simplify each expression. Write each answer in standard form.

5. $(2x + 3)(x + 4)$

6. $(a + 11)(a + 11)$

7. $(2m + 7)(m - 4)$

8. $(x - 4)(x + 4)$

9. $(x + 8)^2$

10. $(3x + 1)^2$

11. $4(a + 2)(3a - 2)$

12. $(5x - 6)^2$

13. $3(y - 6)(y + 7)$

14. $(2x + 7)(2x - 7)$

15. $(a - 13)(a - 13)$

16. $(3y - 4)^2$

17. $(5h - 3)^2$

18. $3(2x + 5)(2x - 5)$

19. $2(5c + 1)(3c + 4)$

20. $(5k - 6)^2$

21. $(3n - 4)(3n + 4)$

22. $(4p + 1)(4p + 1)$

23. $(p - 4)(2p^2 + 3p - 35)$

24. $(4x^2 + 2x + 3)(3x - 8)$

25. $(5t^2 + 3t - 11)(6t - 1)$

26. $(x - 5)(x + 2)(x + 4)$

27. $(2x + 1)(x - 3)(x - 5)$

28. $(c + 4)(c - 3)(3c + 5)$

29. Look through your answers for questions 5-28 and answer the following questions.

a. Which problem numbers had answers that were binomials? {Hint: Four problems have answers like this}

b. What pattern do you notice in the original question of these four problems?

Math 2 Unit 9 Worksheet 3
Factoring Polynomials

Name: _____
 Date: _____ Per: _____

[1-2] **Area Model.** Find the missing side length(s). Write the multiplication problem being modeled and the solution to the problem on the lines below.

1.

_____	+	_____
3x		
$3x^2$		$15x$

 _____ = _____

2.

_____		$2m^2$	+	$4m$	+	1
		$6m^3$		$12m^2$		$3m$

 _____ = _____

[3-14] Factor out the greatest common factor for each polynomial.

3. $9t - 3$

4. $12j^3 + 28$

5. $72x^2 - 63$

6. $12k^3 - 9k^2 + 6$

7. $30n^3 - 18n^2 + 54n$

8. $32z^4 - 80z^3 + 112z^2$

9. $12n^4 + 16n^3 + 20n^2$

10. $24y^6 + 36y^4 + 42y^2$

11. $7q^5 + 21q^3 - 49q$

12. $13cd^3 + 39c^2d^2$

13. $5x^3y^4 - 25xy^2$

14. $42m^5n + 28m^4$

[15-20] Factor out the greatest common factor for each expression.

15. $(x + 5)^2 - (x - 3)(x + 5)$

16. $(x + 7)^2 - (x - 9)(x + 7)$

17. $(x + 1)^2 + (x - 2)(x + 1)$

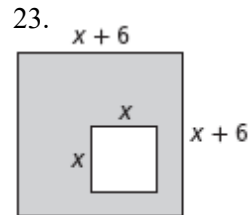
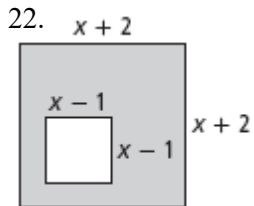
18. $(x - 8)^2 - (x - 8)(x + 2)$

19. $(x + 7)^3 - (x + 7)(x - 2)$

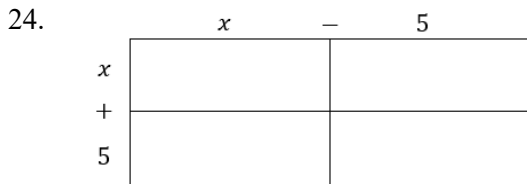
20. $(x - 2)^3 + (x + 8)(x - 2)$

21. A rectangle has a length of $(x + 2)$ inches and a width of $(2x + 3)$ inches. Write an expression that represents the area of the rectangle in simplified form.

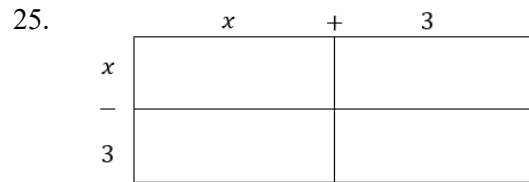
[22-23] The figures below are squares. Write an expression for the area of each shaded region. Write your answers in simplified standard form.



[24-25] **Area Model.** Multiply using the area model. Write the problem being modeled and your solution on the line below.

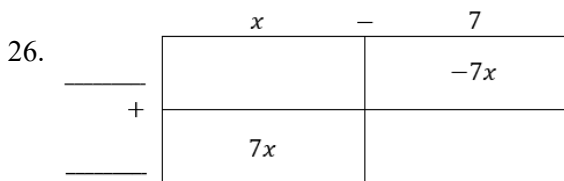


_____ = _____

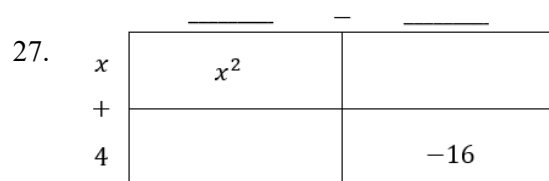


_____ = _____

[26-27] **Area Model.** Fill in the missing side lengths. Write the multiplication problem being modeled and the solution to the problem on the line below.



_____ = _____



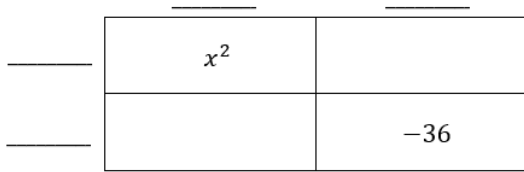
_____ = _____

Math 2 Unit 9 Worksheet 4
Factoring Polynomials

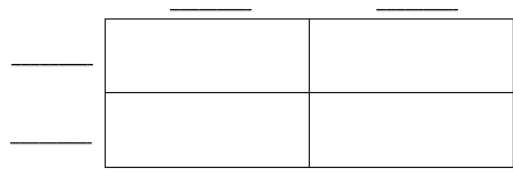
Name: _____
 Date: _____ Per: _____

[1-4] Factor using the Area Model.

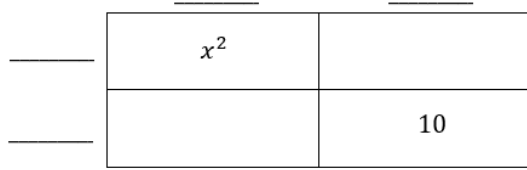
1. $x^2 - 36 =$ _____



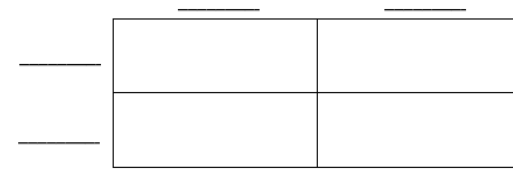
2. $x^2 - 121 =$ _____



3. $x^2 + 7x + 10 =$ _____



4. $x^2 - 9x + 20 =$ _____



[5-8] a) Factor each expression.
 b) Check your answer by multiplying.

5. a) $y^2 + 5y + 6$ b)

6. a) $7n^2 + 13n - 24$ b)

7. a) $x^2 + 16x + 63$ b)

8. a) $3p^2 + 16p + 21$ b)

[9-14] Factor each expression.

9. $z^2 - 3z - 18$

10. $2s^2 + 13s + 6$

11. $p^2 - 12p + 35$

12. $2n^2 + 3n - 35$

13. $y^2 + y - 56$

14. $5n^2 - 13n - 6$

[15-20] a) Factor each expression.

b) Check your answer by multiplying (on 15-18 only).

15. a) $x^2 - 100$ b)

16. a) $4a^2 - 25$ b)

17. a) $9m^2 - 49$ b)

18. a) $36y^2 - 1$ b)

19. $100w^2 - 81$

20. $9x^2 - 25y^2$

21. **Writing:** Explain how to recognize a difference of two squares.

22. **Error Analysis:** Describe and correct the error made in factoring the trinomial.

$$\begin{aligned} &x^2 + 2x - 80 \\ &= (x + 8)(x - 10) \end{aligned}$$

[23-26] Factor completely.

23. $2n^2 + 12n + 10$

24. $3n^2 - 27$

25. $5x^3 + 5x^2 - 30x$

26. $17y^2 - 17$

[27-28] **Error Analysis:** Describe and correct the error made in factoring the trinomial.

27.

$$\begin{aligned} &2x^2 - 16 \\ &(2x + 4)(2x - 4) \end{aligned}$$

28.

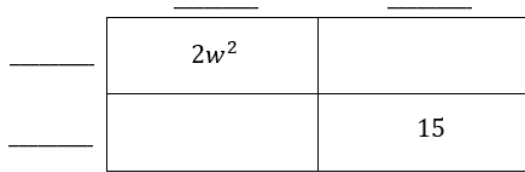
$$\begin{aligned} &5x^2 + 45 \\ &5(x^2 + 9) \\ &5(x + 3)(x - 3) \end{aligned}$$

Math 2 Unit 9 Worksheet 5
Factoring Polynomials

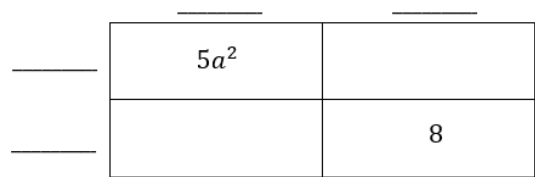
Name: _____
 Date: _____ Per: _____

[1-4] Factor using the Area Model.

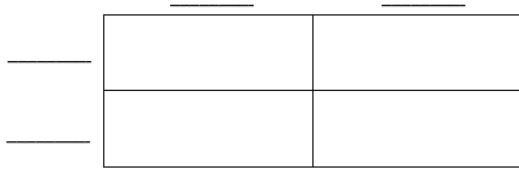
1. $2w^2 + 13w + 15 =$ _____



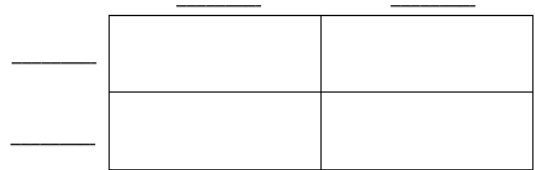
2. $5a^2 - 22a + 8 =$ _____



3. $5y^2 - 17y + 14 =$ _____



4. $3n^2 - 14n + 15 =$ _____



[5-8] a) Factor each expression.
 b) Check your answer by multiplying.

5. a) $2x^2 + 3x - 27$ b)

6. a) $t^2 + 9n + 18$ b)

7. a) $7y^2 + 29y - 30$ b)

8. a) $d^2 + 2d - 15$ b)

[9-18] Factor each expression.

9. $2m^2 + m - 21$

10. $n^2 - 6n - 40$

11. $4b^2 - b - 5$

12. $r^2 - 12r + 27$

13. $6x^2 + 19x - 36$

14. $v^2 - 5v - 36$

15. $7n^2 + 29n - 30$

16. $9b^2 - 65b + 14$

17. $3p^2 + 16p + 21$

18. $3v^2 - 28v - 20$

[19-24] Factor completely.

19. $25x^2 - 35x - 30$

20. $15n^2 - 117n - 24$

21. $10p^2 + 26p + 16$

22. $15k^2 - 80k + 100$

23. $50x^2 - 8$

24. $3m^3 - 27m$

[25-27] Review: Simplify.

25. $(6a^2q)(-4a^2q^4)$

26. $4xy^2(2x^4)^3$

27. $\frac{(4a^4q^{-3})^{-2}}{(2a^{-3}q^4)^3}$

Math 2 Unit 9 Worksheet 6
Factoring Polynomials Completely

Name: _____
Date: _____ **Per:** _____

[1-15] Factor each polynomial completely.

1. $9g^2 - 24g + 16$

2. $6t^2 + 5t - 4$

3. $9b^3 + 65b^2 + 14b$

4. $4a^2 - 36a + 81$

5. $36x^3 + 60x^2 + 25x$

6. $49d^2 - 84d + 36$

7. $2s^2 + 13s + 6$

8. $2w^2 + 13w + 15$

9. $3d^3 + 20d^2 + 12d$

10. $3p^2 - 7p - 40$

11. $6r^2 - 10r - 24$

12. $4n^3 + 62n^2 - 32n$

13. $100t^2 - 100t + 25$

14. $5z^2 + z - 6$

15. $4g^3 + 24g^2 + 16g$

16. Which of the expressions is **NOT** a factor of:
 $5x^3 - 17x^2 + 14x$?

a) $5x - 7$

b) $x - 2$

c) $x - 7$

d) x

17. Which of the expressions is **NOT** a factor of:
 $4x^3 + 14x^2 + 6x$?

a) $2x$

b) $2x + 3$

c) $2x + 1$

d) $x + 3$

18. A rectangular prism has a volume of $10x^3 + 11x^2 - 8x$. What are three factors that could represent the possible dimensions of the rectangular prism? (Hint: Factor completely)



19. A rectangular prism has a volume of $22w^3 - 7w^2 - 2w$. What are three factors that could represent the possible dimensions of the rectangular prism? (Hint: Factor completely)



[20-25] Factor each polynomial completely.

20. $x^2 - 25y^2$

21. $75n^2 - 3p^2$

22. $x^2 + 8xy - 33y^2$

23. $25a^2 - 40ab + 16b^2$

24. $16x^2 - 81y^2$

25. $x^2 + 2xy - 63y^2$

[26-31] Review: Simplify.

26. $4x^2 + 4x^2$

27. $(3x + 2y) - (5x - 3y)$

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

29. $(2x + 3)(3x - 1)$

30. $(4x + 3)(x^2 + 2x - 10)$

31. $(x + 4)^2$

[32-33] Review: Factor Completely.

32. $4x^2 - 16$

33. $(x + 3)^2 - (x - 2)(x + 3)$