Difference of Squares Factoring Practice

Use the following information to answer the first question.

Consider the following algebraic expressions.	
1	$4x^8 + 100$
2	$64y^2 - 1$
3	$49 - 2x - x^2$
4	$121w^4 - 4v^2m^6$

1. The two expressions that could be factored by using difference of squares are

   A) 1 and 2 B) 3 and 4 C) 1 and 3 D) 2 and 4

2. The correct factoring of $1 - 9y^{16}$ is

   A) $(1 - 3y^8)(1 + 3y^8)$

   B) $(1 + 3y^8)(1 + 3y^8)$

   C) $(1 - 3y^8)(1 - 3y^8)$

   D) $(1 - 3y^4)(1 + 3y^4)$

3. When $2x^2 - K$ is completely factored by difference of squares, the result is $2(x + M)(x - 4)$. The value of K is ____.

4. Determine the final factored form of $75x^2y - 432x^4y^3$.

Use the following information to answer the next question.

Jeremy was asked to factor the expression, $w - 81w^5$. His work is shown below.

Step 1	$w(1 - 81w^4)$
Step 2	$w(1 + 9w^2)(1 - 9w^2)$
Step 3	$w(1 + 3w)(1 - 3w)(1 - 9w^2)$
Step 4	$w(1 + 3w)(1 - 3w)(1 + 3w)(1 - 3w)$

5. Unfortunately, Jeremy made an error. The step in which he made the first error is

   A) 1 B) 2 C) 3 D) 4

6. The simplified factored form of $4(x + 2)^2 - 9(x - 5)^2$ is

   A) $(5x + 11)(x + 19)$

   B) $(5x - 11)(-x + 19)$

   C) $(3x + 11)(x + 9)$

   D) $(3x - 11)(-x + 9)$

7. One factor of $x^4 - 4$ is

   A) $(x^2 + 4)$ B) $(x^2 + 2)$ C) $(x - 2)$ D) $(x - 4)$

8. When factoring $3w^6y^3 - 300y$, the first step is to check for a common factor. The common factor is ____.

9. Two factors of $4x^2y^4 - 36x^4y^2$ are
   A) $4xy$ and $(y + 3x)$
   B) $4xy$ and $(y - 3x)$
   C) $4x^2y^2$ and $(y + 3x)$
   D) $4x^2y^2$ and $(y - 6x)$

10. Factor $5x^5 - 405x$ completely.

Difference of Squares Factoring PracticeSolutions

Use the following information to answer the first question.

Consider the following algebraic expressions.	
1	$4x^8 + 100$
2	$64y^2 - 1$
3	$49 - 2x - x^2$
4	$121w^4 - 4v^2m^6$

1. The two expressions that could be factored by using difference of squares are

   A) 1 and 2 B) 3 and 4 C) 1 and 3 D) 2 and 4

Solution

Option 1 has two terms and both terms are perfect squares. However, there is an addition sign instead of a subtraction sign. This expression cannot be factored by difference of squares.

Option 3 has three terms. Therefore, this expression cannot be factored by difference of squares.

Options 2 and 4 both satisfy the requirements for difference of squares factoring. There are two terms, both of which are perfect squares, and there is a subtraction sign between them.

The correct answer is D.

2. The correct factoring of $1 - 9y^{16}$ is

A) $(1 - 3y^8)(1 + 3y^8)$

B) $(1 + 3y^8)(1 + 3y^8)$

C) $(1 - 3y^8)(1 - 3y^8)$

D) $(1 - 3y^4)(1 + 3y^4)$

Solution

The square root of 1, which is 1, is placed as the first term in each binomial. The square root of $9y^{16}$, which is $3y^8$, is placed as the second term in each binomial. One binomial has an addition sign between the terms, and the other binomial term has a subtraction sign between the terms.

The correct answer is A.

3. When $2x^2 - K$ is completely factored by difference of squares, the result is $2(x + M)(x - 4)$. The value of K is _32_.

Solution

The value of M is 4 because the numbers in these positions must be the same. To get K, square 4 and then multiply by the number in front of the binomials, i.e. 2.

The value of K is 32.

4. Determine the final factored form of $75x^2y - 432x^4y^3$.

Solution

Always look for a common factor first. Three will divide into each of the coefficients (75 and 432). In terms of letters, there is a common x^2y. The common factor is $3x^2y$.

$3x^2y\,(25 - 144x^2y^2)$.

The two terms in brackets can be factored by difference of squares.

$3x^2y\,(5 + 12xy)(5 - 12xy)$.

Use the following information to answer the next question.

Jeremy was asked to factor the expression, $w - 81w^5$. His work is shown below.

Step 1	$w(1 - 81w^4)$
Step 2	$w(1 + 9w^2)(1 - 9w^2)$
Step 3	$w(1 + 3w)(1 - 3w)(1 - 9w^2)$
Step 4	$w(1 + 3w)(1 - 3w)(1 + 3w)(1 - 3w)$

5. Unfortunately, Jeremy made an error. The step in which he made the first error is

A) 1 B) 2 C) 3 D) 4

Solution

The first two steps are good.

In step 3, Jeremy tried to factor $(1 + 9w^2)$. He wrote it as being equal to

$(1 + 3w)(1 - 3w)$. This is not correct, since there is an addition sign in the binomial $(1 + 9w^2)$ instead of a subtraction sign. If there was a subtraction sign, he would have been correct.

The correct answer is C.

6. The simplified factored form of $4(x + 2)^2 - 9(x - 5)^2$ is

A) $(5x + 11)(x + 19)$

B) $(5x - 11)(-x + 19)$

C) $(3x + 11)(x + 9)$

D) $(3x - 11)(-x + 9)$

Solution

The square root of $4(x + 2)^2$ is $2(x + 2)$. This expression is placed as the first term in each binomial.

The square root of $9(x - 5)^2$ is $3(x - 5)$. This expression is placed as the second term in each binomial.

When placed in the two large brackets for difference of squares, the result is:

$[2(x + 2) + 3(x - 5)]\ [2(x + 2) - 3(x - 5)]$

Expand and simplify within each large bracket.

$[2x + 4 + 3x - 15]\ [2x + 4 - 3x + 15]$

$(5x - 11)(-x + 19)$

The correct answer is B.

7. One factor of $x^4 - 4$ is

A) $(x^2 + 4)$ B) $(x^2 + 2)$ C) $(x - 2)$ D) $(x - 4)$

Solution

The complete factoring of $x^4 - 4$ is $(x^2 + 2)(x^2 - 2)$. These are the two factors of this expression.

The correct answer is B.

8. When factoring $3w^6y^3 - 300y$, the first step is to check for a common factor. The common factor is _3y_.

Solution

Look first at the coefficients, i.e. 3 and 300. The common factor is 3. Next, check for any common letters in any of the terms. Each term has at least one y.

The common factor is 3y.

9. Two factors of $4x^2y^4 - 36x^4y^2$ are

   A) $4xy$ and $(y + 3x)$

   B) $4xy$ and $(y - 3x)$

   C) $4x^2y^2$ and $(y + 3x)$

   D) $4x^2y^2$ and $(y - 6x)$

Solution

Always check for a common factor first.

The common factor in this case is $4x^2y^2$.

$4x^2y^2 (y^2 - 9x^2)$

$= \quad 4x^2y^2(y + 3x) (y - 3x)$

The correct answer is C.

10. Factor $5x^5 - 405x$ completely.

Solution

Always look for a common factor first.

$5x(x^4 - 81)$

$= \quad 5x (x^2 + 9) (x^2 - 9)$

$= \quad 5x(x^2 + 9) (x + 3) (x - 3)$