

Exit Ticket Sample Solutions

1. Factor the following expression, and verify that the factored expression is equivalent to the original: $4x^2 - 9a^6$

$$\begin{aligned}(2x - 3a^3)(2x + 3a^3) &= 4x^2 + 6a^3x - 6a^3x - 9a^6 \\ &= 4x^2 - 9a^6\end{aligned}$$

2. Factor the following expression, and verify that the factored expression is equivalent to the original: $16x^2 - 8x - 3$

$$\begin{aligned}(4x - 3)(4x + 1) &= 16x^2 + 4x - 12x - 3 \\ &= 16x^2 - 8x - 3\end{aligned}$$

Problem Set Sample Solutions

1. Write $9 - 16x^4$ as the product of two factors.

$$\begin{aligned}9 - 16x^4 &= (3)^2 - (4x^2)^2 \\ &= (3 - 4x^2)(3 + 4x^2)\end{aligned}$$

2. Factor $4x^2y^4 - 25x^4z^6$.

$$\begin{aligned}4x^2y^4 - 25x^4z^6 &= (2xy^2)^2 - (5x^2z^3)^2 \\ &= (2xy^2 + 5x^2z^3)(2xy^2 - 5x^2z^3) \\ &= [x(2y^2 + 5xz^3)][x(2y^2 - 5xz^3)] \\ &= x^2(2y^2 + 5xz^3)(2y^2 - 5xz^3)\end{aligned}$$

3. Factor the following expressions:

A. $4x^2 + 4x - 63$

$$\begin{aligned}4x^2 + 4x - 63 &= (2x)^2 + 2(2x) - 63 \\ &= (2x + 9)(2x - 7)\end{aligned}$$

C. $x^3 - 64$

$$(x - 4)(x^2 + 4x + 16)$$

B. $12y^2 - 24y - 15$

$$\begin{aligned}12y^2 - 24y - 15 &= 3(4y^2 - 8y - 5) \\ &= 3((2y)^2 - 4(2y) - 5) \\ &= 3(2y + 1)(2y - 5)\end{aligned}$$

D. $2x^3 + 128$

$$2(x^3 + 64) = 2(x + 4)(x^2 - 4x + 16)$$

4. If possible, factor the following expressions using the techniques discussed in this lesson.

a. $25x^2 - 25x - 14$ $(5x - 7)(5x + 2)$	b. $9x^2 - 25y^4z^6$ $(3x - 5y^2z^3)(3x + 5y^2z^3)$
c. $9x^2y^2 - 18xy + 8$ $(3xy - 4)(3xy - 2)$	d. $36x^6y^4z^2 - 25x^2z^{10}$ $x^2z^2(6x^2y^2 - 5z^4)(6x^2y^2 + 5z^4)$
e. $45y^2 + 15y - 10$ $5(3y + 2)(3y - 1)$	f. $4x^2 + 9$ Cannot be factored.
g. $y^6 - y^3 - 6$ $(y^3 - 3)(y^3 + 2)$	h. $x^4 - 36$ $(x - \sqrt{6})(x + \sqrt{6})(x^2 + 6)$
i. $x^3 - 125$ $(x - 5)(x^2 + 5x + 25)$	j. $1 + 27x^9$ $(1 + 3x^3)(1 - 3x^3 + 9x^6)$
k. $2x^4 - 16x$ $2x(x - 2)(x^2 + 2x + 4)$	l. $x^3y^6 + 8z^3$ $(xy^2 + 2z)(x^2y^4 - 2xy^2z + 4z^2)$