

Notes: Factoring a Difference of Two Squares

Investigation: Can you solve the riddle and use it to answer the missing problems?

If the factors of $a^2 - 4$ are $(a + 2)(a - 2)$ and the factors of $81 - x^2$ are $(9 - x)(9 + x)$

and the factors of $25x^2 - 49$ are $(5x + 7)(5x - 7)$

then.....

$\begin{matrix} \checkmark & & \checkmark \\ 25x^2 & - & 49 \\ & \uparrow & \\ & \text{no} & \\ & \text{middle} & \end{matrix}$

$\begin{matrix} \text{---} & \text{---} & \text{---} \\ & \text{---} & \\ & + 35x & \\ & - 35x & \end{matrix}$

What are the factors of: 1. $c^2 - 100$? $(c + 10)(c - 10)$ 2. $9x^2 - 100$? $(3x + 10)(3x - 10)$ 3. $64 - v^2$? $(8 + v)(8 - v)$

Subtract

Therefore, to factor a difference of squares, use the following rule: $a^2 - b^2 = \underline{(a + b)(a - b)}$

Which of the following could be categorized as a *Difference of Two Squares*?

1. $x^2 - 16$

yes

2. $m^2 \oplus 49$

NO

"PRIME"

3. $y^2 - 35$

NO

4. $25a^2 - 121$

yes

5. $64 - 49t^2$

yes

6. $81k^2 \oplus 225$

PRIME

7. $x^2 \oplus 1$

PRIME

8. $x^2 - 18$

NO

Examples: Factor completely. If it cannot be factored, write "prime."

1. $x^2 - 16$ 2. $m^2 - 49$ 3. $b^2 - 25$ 4. $\sqrt{36x^2} \cdot \sqrt{100}$
 $(x+4)(x-4)$ $(m+7)(m-7)$ $(b+5)(b-5)$ $(6x+10)(6x-10)$

5. $b^2 - 1$ 6. $9a^2 - 25$ 7. $4t^2 + 25$ 8. $4x^2 - 9y^2$
 $(b+1)(b-1)$ $(3a+5)(3a-5)$ **PRIME!** $(2x-3y)(2x+3y)$



As with any factoring problem, **ALWAYS** see if there is a GCF first. Sometimes Differences of Squares try to hide!

1) $8y^2 - 50$
 $2(4y^2 - 25)$
 $2(2y+5)(2y-5)$

2) $3c^2 - 75$
 $3(c^2 - 25)$
 $3(c+5)(c-5)$

3) $28k^2 - 7$
 $7(4k^2 - 1)$
 $7(2k-1)(2k+1)$

4) $28a^2 - 63$
 $7(4a^2 - 9)$
 $7(2a-3)(2a+3)$

5) $12x^2 - 75$
 $3(4x^2 - 25)$
 $3(2x+5)(2x-5)$

6) $5x^2 - 45$
 $5(x^2 - 9)$
 $5(x+3)(x-3)$

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