Factoring Quadratics: Special Cases

## Learning Goal

(0) Factor perfect-square trinomials and difference of squares.

## Minds on...

(2) How do you find the area of a square?

$$
\begin{aligned}
A=l \times w & \sigma r
\end{aligned} A=l \times l
$$

© What if I give you the area of the square, how do you find its dimensions?


- We think of polynomials as area models.


## Minds on...

| Factors | Perfect <br> Square | Factors | Perfect <br> Square |
| :--- | :--- | :--- | :--- |
| $1 \times 1$ | $=1$ | $11 \times 11$ | $=121$ |
| $2 \times 2$ | $=4$ | $12 \times 12$ | $=144$ |
| $3 \times 3$ | $=9$ | $13 \times 13$ | $=169$ |
| $4 \times 4$ | $=16$ | $14 \times 14$ | $=196$ |
| $5 \times 5$ | $=25$ | $15 \times 15$ | $=225$ |
| $6 \times 6$ | $=36$ | $16 \times 16$ | $=256$ |
| $7 \times 7$ | $=49$ | $17 \times 17$ | $=289$ |
| $8 \times 8$ | $=64$ | $18 \times 18$ | $=324$ |
| $9 \times 9$ | $=81$ | $19 \times 19$ | $=361$ |
| $10 \times 10$ | $=100$ | $20 \times 20$ | $=400$ |

## Big Ideas

© Perfect Squares
© Factor each of the following:

$$
\sqrt{9}=3
$$

$\bigcirc$

$$
p+49
$$

$$
5:-14
$$

$$
\begin{aligned}
& x^{2}-14 x+49 \\
= & (x-7)(x-7) \\
= & (x-7)^{2}
\end{aligned}
$$

$$
O R x^{2}-14 x+49
$$

$$
\sqrt{x^{2}}=1 x
$$

$$
b \times a \sqrt{49}=7
$$

$$
=(x-7)^{2}
$$

$$
\begin{aligned}
& 9 x^{2}-30 x+25 \sqrt{25} \leq 5 \\
& =(3 x-5)^{2} \quad(3)(5)(2)=30 \\
& \text { Check: } 3 x-5)(3 x-5) \\
& =9 x^{2}-15 x-15 x+25 \\
& =9 x^{2}-30 x+25
\end{aligned}
$$

Factor

$$
\begin{aligned}
& 81 x^{2}+144 x+64 \\
= & (9 x+8)^{2}
\end{aligned}
$$

Check for

$$
\begin{aligned}
& \text { Perfect Square } \\
& \sqrt{81}=9 \\
& \sqrt{64}=8 \\
& (9)(8)(2)=144^{\sqrt{2}} \\
& 0
\end{aligned}
$$

## Big Ideas (continued)

© Difference of Squares

- $a^{2}-b^{2}$
$=(a+b)(a-b)$
(0) Factor each of the following fully.

$$
\sqrt{x^{2}}=x
$$

$$
x^{2}-16
$$

$$
100 x^{2}-81
$$

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

Check: $(x+4)(x-4)$

$$
\begin{aligned}
& =x^{2} \underbrace{-4 x+4 x}_{0}-16 \\
& =x^{2}-16
\end{aligned}
$$

Consolidation
© You need to be suspicious whenever you notice the perfect squares!

$$
\begin{aligned}
& \left\{\begin{array}{l}
\text { heck the middle } \\
\text { term! }
\end{array}\right. \\
& a^{2}+2 a b+b^{2} \\
& a^{2}-2 a b+b^{2}
\end{aligned}
$$

Reinforcement
(-) Pages 230-231

- \#1-11 (all every other part), 12*, 14 3-11

Check website tonight for tomorrow's note!

