

8.7 PART 2

FACTORING PERFECT SQUARE TRINOMIALS

PERFECT SQUARE TRINOMIALS

$$a^2 + 2ab + b^2 = (a + b)^2$$

or

$$a^2 - 2ab + b^2 = (a - b)^2$$

THREE QUESTIONS

1. Is the first term a perfect square?
2. Is the last term a perfect square?
3. Is the middle term equal to twice the answers to #1 & #2?

If you answered yes to all three questions...
then **CHA-CHING!** You have a
perfect square trinomial.

EXAMPLES: Determine whether each trinomial is a perfect square trinomial. If so, factor it.

1. $25x^2 + 30x + 9$

THREE QUESTIONS

1. $25x^2 = (\underline{5x})^2$

2. $9 = (\underline{3})^2$

3. $30x = 2(\underline{5x})(\underline{3})$

$$(\underline{5x + 3})^2$$

EXAMPLES: Determine whether each trinomial is a perfect square trinomial. If so, factor it.

2. $4k^2 - 44k + 121$

THREE QUESTIONS

1. $4k^2 = (\underline{2k})^2$

2. $121 = (\underline{11})^2$

3. $44k = 2(\underline{2k})(\underline{11})$

$$(\underline{2k - 11})^2$$

EXAMPLES: Determine whether each trinomial is a perfect square trinomial. If so, factor it.

3. $49y^2 + 42y + 36$

THREE QUESTIONS

1. $49y^2 = (7y)^2$

2. $36 = (6)^2$

3. $42y = 2(7y)(6)$

~~$(\quad)^2$~~

EXAMPLES: Determine whether each trinomial is a perfect square trinomial. If so, factor it.

4. $x^2 - 12x + 36$

$\checkmark x^2 = (x)^2$

$\checkmark 36 = (6)^2$

$\checkmark 12x = 2(x)(6)$

$(x - 6)^2$

5. $a^2 + 14a - 49$

$\checkmark a^2 = (a)^2$ not a perf. sq. tri.

EXAMPLES: Determine whether each trinomial is a perfect square trinomial. If so, factor it.

6. $25t^2 - 30t + 36$ ← not perf. sq. tri.

$$\checkmark 25t^2 = (5t)^2$$

$$\checkmark 36 = (6)^2$$

$$\times 30t \neq 2(5t)(6)$$

7. $49v^2 - 56v + 16$

$$\checkmark 49v^2 = (7v)^2$$

$$\checkmark 16 = (4)^2$$

$$\checkmark 56v = 2(7v)(4)$$

$$(7v - 4)^2$$

EXAMPLES: Determine whether each trinomial is a perfect square trinomial. If so, factor it.

8. $49 + 25t^2 - 70t$

$$25t^2 - 70t + 49$$

$$\checkmark 25t^2 = (5t)^2$$

$$\checkmark 49 = (7)^2$$

$$\checkmark 70t = 2(5t)(7)$$

$$(5t - 7)^2$$

9. $x^2y^2 - 6abxy + 9a^2b^2$

$$\checkmark x^2y^2 = (xy)^2$$

$$\checkmark 9a^2b^2 = (3ab)^2$$

$$\checkmark 6abxy = 2(xy)(3ab)$$

$$(xy - 3ab)^2$$

ALWAYS
LOOK
FOR A
GCF
FIRST!!

$$10. 3j^2 - 30j + 75 = 0$$

$$3(j^2 - 10j + 25) = 0$$

$$\begin{aligned} \sqrt{j^2} &= (j)^2 \\ \sqrt{25} &= (5)^2 \\ \sqrt{10j} &= 2(j)(5) \end{aligned}$$

$$3(j-5)^2 = 0$$

$$j-5=0 \rightarrow \boxed{j=5}$$

$$11. 2a^2 + 28a + 98$$

$$2(a^2 + 14a + 49)$$

$$\begin{aligned} \sqrt{a^2} &= (a)^2 \\ \sqrt{49} &= (7)^2 \\ \sqrt{14a} &= 2(a)(7) \end{aligned}$$

$$2(a+7)^2$$

ALWAYS
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$$12. -3g^2 + 36g - 108$$

$$-3(g^2 - 12g + 36)$$

$$\begin{aligned} \sqrt{g^2} &= (g)^2 \\ \sqrt{36} &= (6)^2 \\ \sqrt{12g} &= 2(g)(6) \end{aligned}$$

$$-3(g-6)^2$$

$$13. d^2 + \frac{2}{3}d + \frac{1}{9} = 0$$

$$\begin{aligned} \sqrt{d^2} &= (d)^2 \\ \sqrt{\frac{1}{9}} &= \left(\frac{1}{3}\right)^2 \\ \sqrt{\frac{2}{3}d} &= 2(d)\left(\frac{1}{3}\right) \end{aligned}$$

$$\left(d + \frac{1}{3}\right)^2 = 0$$

$$d + \frac{1}{3} = 0$$

$$\boxed{d = -\frac{1}{3}}$$