

NAME _____

DATE _____

COMPLETE THE SQUARE: Worksheet 1

Are the following perfect trinomial squares (yes or no)?

1) $x^2 + 25x + 25$

2) $9a^2 + 24a + 16$

3) $x^2 + 14x + 49$

4) $4y^2 + 20y + 10$

5) $4x^2 - 40x + 100$

6) $x^2 + 4x + 4$

Find the value of c to make each a trinomial a perfect square.

7) $x^2 + 16x + c$

8) $y^2 - 20y + c$

9) $x^2 + 5x + c$

10) $a^2 + 10a + c$

Solve each equation by factoring the perfect trinomial square.

11) $4x^2 + 4x + 1 = 0$

12) $9x^2 - 12x + 4 = 0$

13) $x^2 + 6x + 9 = 0$

14) $16x^2 + 16x = -4$

15) $x^2 - 12x + 36 = 0$

16) $x^2 - 10x = -25$

Solve each equation by completing the square. Round to the nearest tenth if necessary.

17) $x^2 + 10x = 20$

18) $x^2 + 4x - 12 = 0$

19) $x^2 + 6x = 7$

20) $x^2 - 14x + 30 = 6$

21) $x^2 - 8x + 10 = 0$

22) $2x^2 + 20x = -2$

KEY

COMPLETE THE SQUARE: Worksheet 1

Are the following perfect trinomial squares (yes or no)?

1) $x^2 + 25x + 25$
no

2) $9a^2 + 24a + 16$
yes

3) $x^2 + 14x + 49$
yes

4) $4y^2 + 20y + 10$
no

5) $4x^2 - 40x + 100$
yes

6) $x^2 + 4x + 4$
yes

Find the value of c to make each a trinomial a perfect square.

7) $x^2 + 16x + c$
 $c = \left(\frac{16}{2}\right)^2 = 64$

8) $y^2 - 20y + c$
 $c = \left(\frac{-20}{2}\right)^2 = 100$

9) $x^2 + 5x + c$
 $c = \left(\frac{5}{2}\right)^2 = \frac{25}{4}$

10) $a^2 + 10a + c$
 $c = \left(\frac{10}{2}\right)^2 = 25$

Solve each equation by factoring the perfect trinomial square.

11) $4x^2 + 4x + 1 = 0$
 $(2x + 1)(2x + 1) = 0$
 $\left\{ -\frac{1}{2} \right\}$

12) $9x^2 - 12x + 4 = 0$
 $(3x - 2)(3x - 2) = 0$
 $\left\{ \frac{2}{3} \right\}$

13) $x^2 + 6x + 9 = 0$
 $(x + 3)(x + 3) = 0$
 $\left\{ -3 \right\}$

14) $16x^2 + 16x = -4$
 $16x^2 + 16x + 4 = 0$
 $(4x + 2)(4x + 2) = 0$
 $\left\{ -\frac{1}{2} \right\}$

15) $x^2 - 12x + 36 = 0$
 $(x - 6)(x - 6) = 0$
 $\left\{ 6 \right\}$

16) $x^2 - 10x = -25$
 $x^2 - 10x + 25 = 0$
 $(x - 5)(x - 5) = 0$
 $\left\{ 5 \right\}$

Solve each equation by completing the square. Round to the nearest tenth if necessary.

17) $x^2 + 10x = 20$

$$\begin{aligned} x^2 + 10x + 25 &= 20 + 25 \\ (x+5)(x+5) &= 45 \\ \sqrt{(x+5)^2} &= \pm\sqrt{45} \\ x+5 &= \pm\sqrt{45} \\ x &= \pm\sqrt{45} - 5 \\ x &= \pm 6.7 - 5 \\ &\{1.7, -11.7\} \end{aligned}$$

18) $x^2 + 4x - 12 = 0$

$$\begin{aligned} x^2 + 4x &= 12 \\ x^2 + 4x + 4 &= 12 + 4 \\ (x+2)(x+2) &= 16 \\ \sqrt{(x+2)^2} &= \pm\sqrt{16} \\ x+2 &= \pm 4 \\ x &= \pm 4 - 2 \\ &\{2, -6\} \end{aligned}$$

19) $x^2 + 6x = 7$

$$\begin{aligned} x^2 + 6x + 9 &= 7 + 9 \\ (x+3)(x+3) &= 16 \\ \sqrt{(x+3)^2} &= \pm\sqrt{16} \\ x+3 &= \pm 4 \\ x &= \pm 4 - 3 \\ &\{1, -7\} \end{aligned}$$

20) $x^2 - 14x + 30 = 6$

$$\begin{aligned} x^2 - 14x &= -24 \\ x^2 - 14x + 49 &= -24 + 49 \\ (x-7)(x-7) &= 25 \\ \sqrt{(x-7)^2} &= \pm\sqrt{25} \\ x-7 &= \pm 5 \\ x &= \pm 5 + 7 \\ &\{12, 2\} \end{aligned}$$

21) $x^2 - 8x + 10 = 0$

$$\begin{aligned} x^2 - 8x &= -10 \\ x^2 - 8x + 16 &= -10 + 16 \\ (x-4)(x-4) &= 6 \\ \sqrt{(x-4)^2} &= \pm\sqrt{6} \\ x-4 &= \pm\sqrt{6} \\ x &= \pm\sqrt{6} + 4 \\ x &= \pm 2.4 + 4 \\ &\{6.4, 1.6\} \end{aligned}$$

22) $2x^2 + 20x = -2$

$$\begin{aligned} \frac{2x^2 + 20x}{2} &= \frac{-2}{2} \\ x^2 + 10x &= -1 \\ x^2 + 10x + 25 &= -1 + 25 \\ (x+5)(x+5) &= 24 \\ \sqrt{(x+5)^2} &= \pm\sqrt{24} \\ x+5 &= \pm\sqrt{24} \\ x &= \pm\sqrt{24} - 5 \\ x &= \pm 4.9 - 5 \\ &\{-.1, -9.9\} \end{aligned}$$