

NAME _____

DATE _____

COMPLETE THE SQUARE: Worksheet 2

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

1) $x^2 + 6x + 9$

2) $a^2 + 10a + 25$

3) $9x^2 + 24x + 4$

4) $4y^2 + 16y + 16$

5) $x^2 - 8x - 16$

6) $x^2 + 18x + 81$

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

7) $x^2 + 40x + c$

8) $y^2 - 6y + c$

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

10) $a^2 + 7a + c$

Solve each equation by factoring the perfect trinomial square.

11) $x^2 + 8x + 16 = 0$

12) $4x^2 - 8x + 4 = 0$

13) $x^2 + 12x + 36 = 0$

14) $16x^2 - 24x = -9$

15) $x^2 - 14x = -49$

16) $25x^2 + 10x + 1 = 0$

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

17) $x^2 + 12x = 20$

18) $x^2 - 8x + 15 = 0$

19) $x^2 - 2x = 15$

20) $x^2 + 12x + 21 = 10$

21) $x^2 - 4x + 1 = 0$

22) $3x^2 - 6x = 15$

KEY

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

1) $x^2 + 6x + 9$
yes

2) $a^2 + 10a + 25$
yes

3) $9x^2 + 24x + 4$
no

4) $4y^2 + 16y + 16$
yes

5) $x^2 - 8x - 16$
no

6) $x^2 + 18x + 81$
yes

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

7) $x^2 + 40x + c$
 $c = \left(\frac{40}{2}\right)^2 = 400$

8) $y^2 - 6y + c$
 $c = \left(\frac{-6}{2}\right)^2 = 9$

9) $x^2 + 2x + c$
 $c = \left(\frac{2}{2}\right)^2 = 1$

10) $a^2 + 7a + c$
 $c = \left(\frac{7}{2}\right)^2 = \frac{49}{4}$

Solve each equation by factoring the perfect trinomial square.

11) $x^2 + 8x + 16 = 0$
 $(x+4)(x+4) = 0$
 $\{-4\}$

12) $4x^2 - 8x + 4 = 0$
 $(2x-2)(2x-2) = 0$
 $\{1\}$

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

14) $16x^2 - 24x = -9$
 $16x^2 - 24x + 9 = 0$
 $(4x-3)(4x-3) = 0$
 $\left\{\frac{3}{4}\right\}$

15) $x^2 - 14x = -49$
 $x^2 - 14x + 49 = 0$
 $(x-7)(x-7) = 0$
 $\{7\}$

16) $25x^2 + 10x + 1 = 0$
 $(5x+1)(5x+1) = 0$
 $\left\{-\frac{1}{5}\right\}$

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

17) $x^2 + 12x = 20$

$$\begin{aligned} x^2 + 12x + 36 &= 20 + 36 \\ (x+6)(x+6) &= 56 \\ \sqrt{(x+6)^2} &= \pm\sqrt{56} \\ x+6 &= \pm\sqrt{56} \\ x &= \pm\sqrt{56} - 6 \\ x &= \pm 7.5 - 6 \\ &\{1.5, -13.5\} \end{aligned}$$

18) $x^2 - 8x + 15 = 0$

$$\begin{aligned} x^2 - 8x &= -15 \\ x^2 - 8x + 16 &= -15 + 16 \\ (x-4)(x-4) &= 1 \\ \sqrt{(x-4)^2} &= \pm\sqrt{1} \\ x-4 &= \pm 1 \\ x &= \pm 1 + 4 \\ &\{5, 3\} \end{aligned}$$

19) $x^2 - 2x = 15$

$$\begin{aligned} x^2 - 2x + 1 &= 15 + 1 \\ (x-1)(x-1) &= 16 \\ \sqrt{(x-1)^2} &= \pm\sqrt{16} \\ x-1 &= \pm 4 \\ x &= \pm 4 + 1 \\ &\{5, -3\} \end{aligned}$$

20) $x^2 + 12x + 21 = 10$

$$\begin{aligned} x^2 + 12x &= -11 \\ x^2 + 12x + 36 &= -11 + 36 \\ (x+6)(x+6) &= 25 \\ \sqrt{(x+6)^2} &= \pm\sqrt{25} \\ x+6 &= \pm 5 \\ x &= \pm 5 - 6 \\ &\{-1, -11\} \end{aligned}$$

21) $x^2 - 4x + 1 = 0$

$$\begin{aligned} x^2 - 4x &= -1 \\ x^2 - 4x + 4 &= -1 + 4 \\ (x-2)(x-2) &= 3 \\ \sqrt{(x-2)^2} &= \pm\sqrt{3} \\ x-2 &= \pm\sqrt{3} \\ x &= \pm\sqrt{3} + 2 \\ x &= \pm 1.7 + 2 \\ &\{3.7, .3\} \end{aligned}$$

22) $3x^2 - 6x = 15$

$$\begin{aligned} \frac{3x^2 - 6x}{3} &= \frac{15}{3} \\ x^2 - 2x &= 5 \\ x^2 - 2x + 1 &= 5 + 1 \\ (x-1)(x-1) &= 6 \\ \sqrt{(x-1)^2} &= \pm\sqrt{6} \\ x-1 &= \pm\sqrt{6} \\ x &= \pm\sqrt{6} + 1 \\ x &= \pm 2.4 + 1 \\ &\{3.4, -1.4\} \end{aligned}$$