

Homework Answers - p. 278

40. $65 + 72i$ 41. $\pm 5i$ 42. $\pm \frac{i\sqrt{2}}{2}$
 43. $\pm \frac{8i\sqrt{3}}{3}$ 44. $\pm i\sqrt{7}$ 45. $\pm 6i$
 46. $\pm \frac{i\sqrt{15}}{5}$ 47. $-i, -1 - i, i$
 48. $-2i, -4 - 2i, 12 + 14i$ 49. $1 - i, 1 - 3i, -7 - 7i$
 50. $\pm i\sqrt{65}$ 51. $\pm 7i$ 52. $\pm i$
 55. B 56. $-5, 5$ 57. $288i$
 58. $-1 + 5i$ 59. $10 - 4i$ 60. $8 - 2i$
 61. $11 - 5i$ 62. $6 + 10i$ 63. $7 - i$
 64. $10 + 11i$ 65. $-27 + 8i$ 66. $-13 + i$
 68. $x = -7, y = 3$ 69. $x = \frac{16}{3}, y = -\frac{19}{8}$ 70. $x = -7, y = -3$

Oct 20-11:30 AM

(44) $\sqrt{x^2} = \pm \sqrt{-7}$
 $x = \pm \sqrt{-7}$
 $x = \pm i\sqrt{7}$

Oct 22-11:31 AM

Solve:
 (50) $x^2 + 16 = -49$
 $\sqrt{x^2} = \sqrt{-65}$
 $x = \pm i\sqrt{65}$

Oct 21-11:40 AM

$$\begin{aligned} (56) \quad (x+3i)(x-3i) &= 34 \\ x^2 - \cancel{3ix} + \cancel{3ix} - 9i^2 &= 34 \\ x^2 - 9(-1) &= 34 \\ x^2 + 9 &= 34 \\ \sqrt{x^2} &= \sqrt{25} \quad x = \pm 5 \end{aligned}$$

Oct 22-11:35 AM

$$\begin{aligned} (57) \quad (8i)(4i)(-9i) \\ 8 \cdot 4 \cdot -9 i^3 \\ -288 i^3 \\ -288 i^2 \cdot i \\ -288 (-1) \cdot i \\ 288 i \end{aligned}$$

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$$\begin{aligned} (59) \quad (4 + \sqrt{-9}) + (6 - \sqrt{-49}) \\ \sqrt{-1} \cdot \sqrt{9} \\ (4 + 3i) + (6 - 7i) \\ 10 - 4i \end{aligned}$$

Oct 21-11:39 AM

$$\textcircled{61} (8 - \sqrt{-1}) - (-3 + \sqrt{-16})$$

$$(8 - i) - (-3 + 4i)$$

$$11 - 5i$$

Oct 22-11:41 AM

$$\textcircled{61} (8 - \sqrt{-1}) - (-3 + \sqrt{-16})$$

$$(8 - i) - (-3 + 4i)$$

$$11 - 5i$$

Oct 21-11:36 AM

$$\textcircled{69} 3x + 19i = 16 - 8yi$$

$$3x = 16 \quad 19 = -8y$$

$$x = \frac{16}{3} \quad \frac{19}{-8} = y$$

Oct 21-11:29 AM

5.7 Solving Quadratic Equations by Completing the Square

Nov 6-7:07 AM

Perfect Square Trinomials

Examples

$$x^2 + 6x + 9 = (x+3)(x+3) = (x+3)^2$$

$$x^2 - 10x + 25 = (x-5)(x-5) = (x-5)^2$$

$$x^2 + 12x + 36 = (x+6)^2$$

Nov 6-7:23 AM

Creating a Perfect Square Trinomial

- In the following perfect square trinomial, the constant term is missing.

$$x^2 - 14x + \underline{\quad\quad\quad} \quad \left(\frac{b}{2}\right)^2$$

- Find the constant term $x^2 - 14x + \underline{49}$
 $x^2 - 14x + 49$
- How did you find the constant term?

Nov 6-7:24 AM

Perfect Square Trinomials

Complete the square. (#7-12)

1) $x^2 + 20x + \left(\frac{20}{2}\right)^2$
 $x^2 + 20x + 100$

2) $x^2 - 4x + \left(\frac{-4}{2}\right)^2$
 $x^2 - 4x + 4$

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

Nov 6-7:28 AM

Solving Quadratic Equations

Solve the following equation:

$$x^2 - 14x + 49 = 81$$

$$(x-7)(x-7) = 81$$

Step 1: Factor the left side. $\sqrt{(x-7)^2} = \sqrt{81}$

Step 2: Write as a perfect square. $x-7 = \pm 9$

Step 3: Find square roots. $x = 7 \pm 9$


Step 4: Solve both equations. $x = 16$ or $x = -2$

Nov 6-7:30 AM

Now you try!

4) Solve: $x^2 + 6x + 9 = 25$

Nov 6-7:45 AM



Solve by Completing the Square

$$x^2 + 8x - 20 = 0$$

Set up Equation: Move constant "c" to one side.

Nov 6-7:46 AM

$$x^2 + 8x = 20$$

Step 1: Find the term that completes the square on the left side of the equation. Add that term to both sides.

$$x^2 + 8x + \boxed{16} = 20 + \boxed{16}$$

Step 2: Factor and write as a perfect square.

$$(x+4)(x+4) = 20+16$$

$$(x+4)^2 = 36$$

Nov 6-7:59 AM

Step 3: Take the square root of each side

$$\sqrt{(x+4)^2} = \pm\sqrt{36}$$


Step 4: Solve

$$(x+4) = \pm 6$$

$$x = -4 \pm 6$$

$$x = \underline{2} \text{ or } \underline{-10}$$

Nov 6-8:03 AM




Solve by completing the square.
Remember to factor out "a".

7) $2x^2 - 6x + 3 = 0$

$$2x^2 - 6x = -3$$
$$2\left(x^2 - 3x + \left(\frac{-3}{2}\right)^2\right) = -3 + 2\left(\frac{9}{2}\right)$$
$$2\left(x - \frac{3}{2}\right)^2 = -3 + \frac{9}{2}$$
$$\frac{1}{2} \cdot 2\left(x - \frac{3}{2}\right)^2 = \frac{3}{2} \cdot \frac{1}{2} \cdot 2$$
$$\sqrt{\left(x - \frac{3}{2}\right)^2} = \pm \sqrt{\frac{3}{4}}$$
$$x - \frac{3}{2} = \pm \frac{\sqrt{3}}{2}$$
$$x = \frac{3}{2} \pm \frac{\sqrt{3}}{2}$$

Nov 6-8:15 AM



Rewrite the equation in vertex form.
Hint: $y = a(x - h)^2 + k$


8) $y = x^2 - 10x - 2$

Vertex

$$x = \frac{-b}{2a}$$

plug in x to find y.

Nov 6-8:15 AM



HW 5.6 ASSIGNMENT

p. 285

(7 - 17 all, 21 - 27 odd 31,32,39 a and b)

Nov 6-7:05 AM

Example 2 Complete the square.

282) 7. $x^2 + 18x + \blacksquare$ 8. $x^2 - x + \blacksquare$ 9. $x^2 - 24x + \blacksquare$
 10. $x^2 + 20x + \blacksquare$ 11. $m^2 - 3m + \blacksquare$ 12. $x^2 + 4x + \blacksquare$

Example 4 Solve each quadratic equation by completing the square.

283) 13. $x^2 - 3x = 28$ 14. $x^2 - 3x = 4$ 15. $x^2 + 6x + 41 = 0$
 16. $x^2 - 2x = -2$ 17. $w^2 - 8w - 9 = 0$ 18. $x^2 + 6x = -22$
 19. $x^2 + 4 = 0$ 20. $-x^2 - 2x = 5$ 21. $6x - 3x^2 = -12$

Example 5

284) 22. $2p^2 = 6p - 20$ 23. $3x^2 - 12x + 7 = 0$ 24. $4c^2 + 10c = -7$
 25. $2x^2 + x - 28 = 0$ 26. $9x^2 - 12x + 5 = 0$ 27. $4x^2 + 4x = 3$

$x^2 - 3x + (\frac{-3}{2})^2 = \frac{9}{4} + \frac{9}{4}$
 $(x - \frac{3}{2})^2 = \frac{18}{4}$

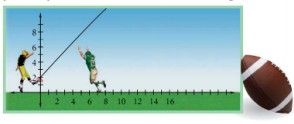
Oct 20-11:39 AM

Example 6 Rewrite each equation in vertex form. (page 284)

28. $y = x^2 + 4x - 7$ 29. $y = -x^2 + 4x - 1$ 30. $y = -2x^2 + 6x + 1$
 31. $y = x^2 + 4x + 1$ 32. $y = 2x^2 - 8x + 1$ 33. $y = -x^2 - 2x + 3$

GO for Help For a guide to solving Exercise 39, see page 288.

39. **Sports** The height of a punted football can be modeled with the quadratic function $h = -0.01x^2 + 1.18x + 2$. The horizontal distance in feet from the point of impact with the kicker's foot is x , and h is the height of the ball in feet.



a. Find the vertex of the graph of the function by completing the square.
 b. What is the maximum height of the punt?

Oct 30-2:01 PM