

Algebra II
Section 5-3 & 5-4 Review

Name KEY

Fill in the blank with the number that correctly makes each trinomial a perfect square (COMPLETE THE SQUARE).

1) $x^2 + 14x + \underline{49}$

2) $n^2 - 22n + \underline{121}$

3) $p^2 + 2p + \underline{1}$

4) $y^2 - 3y + \underline{\frac{9}{4}}$ or 2.25

5) $m^2 - 5m + \underline{\frac{25}{4}}$

6) $x^2 + \frac{9}{2}x + \underline{\frac{81}{16}}$

(you may use a decimal)

(fraction only!!)

(fraction only!!)

Solve each equation by completing the square.

7) $x^2 + 4x + 4 = 1$

$$(x+2)(x+2) = 1$$

$$(x+2)^2 = 1$$

$$\sqrt{(x+2)^2} = \pm\sqrt{1}$$

$$x+2 = \pm 1$$

$$x = +1 - 2, \quad x = -1 - 2$$

$$x = -1, \quad x = -3$$

8) $x^2 + 16x + 64 = 15$

$$(x+8)(x+8) = 15$$

$$(x+8)^2 = 15$$

$$x+8 = \pm\sqrt{15}$$

$$x = -8 \pm\sqrt{15}$$

9) $z^2 - 10z + 17 = 0$

$$z^2 - 10z \underline{\quad} = -17 \underline{\quad}$$

$$z^2 - 10z + \underline{25} = -17 + \underline{25}$$

$$(z-5)^2 = 8$$

$$z-5 = \pm\sqrt{8}$$

$$z-5 = \pm\sqrt{4}\sqrt{2}$$

$$z-5 = \pm 2\sqrt{2}$$

$$z = 5 \pm 2\sqrt{2}$$

10) $a^2 - 2a + 4 = 0$

$$a^2 - 2a \underline{\quad} = -4 \underline{\quad}$$

$$a^2 - 2a + \underline{1} = -4 + \underline{1}$$

$$(a-1)^2 = -3$$

$$a-1 = \pm\sqrt{-3}$$

$$a-1 = \pm i\sqrt{3}$$

$$a = 1 \pm i\sqrt{3}$$

11) What part of the quadratic formula gives you the discriminant?

$$b^2 - 4ac$$

$$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$$

For the following equations, determine the discriminant, then circle the appropriate multiple choice answer to describe the solutions (or roots). You do not need to solve it completely.

$$\begin{aligned}
 12) \quad & 9x^2 - 24x + 16 = 0 \\
 & = \frac{24 \pm \sqrt{576 - 4(9)(16)}}{18} \\
 & = \frac{24 \pm \sqrt{576 - 576}}{18} \\
 & = \frac{24 \pm \sqrt{0}}{18}
 \end{aligned}$$

$$D = \underline{0}$$

- a) 2-rational roots
- b) 2-irrational roots
- c) 1-rational root
- d) 2-imaginary roots

$$\begin{aligned}
 13) \quad & 7x^2 + 6x + 2 = 0 \\
 & = \frac{-6 \pm \sqrt{36 - 4(7)(2)}}{14} \\
 & = \frac{-6 \pm \sqrt{36 - 56}}{14} \\
 & = \frac{-6 \pm \sqrt{-20}}{14}
 \end{aligned}$$

$$D = \underline{-20}$$

- a) 2-rational roots
- b) 2-irrational roots
- c) 1-rational root
- d) 2-imaginary roots

$$\begin{aligned}
 14) \quad & 5x^2 - 2x - 4 = 0 \\
 & = \frac{2 \pm \sqrt{4 - 4(5)(-4)}}{10} \\
 & = \frac{2 \pm \sqrt{4 + 80}}{10} \\
 & = \frac{2 \pm \sqrt{84}}{10}
 \end{aligned}$$

$$D = \underline{84}$$

- a) 2-rational roots
- b) 2-irrational roots
- c) 1-rational root
- d) 2-imaginary roots

Solve each equation using the quadratic formula. You do not need to list the discriminant nor the type of solutions that you will get. Just do the formula to the END!

$$\begin{aligned}
 15) \quad & x^2 + 2x - 35 = 0 \\
 & = \frac{-2 \pm \sqrt{4 - 4(1)(-35)}}{2} \\
 & = \frac{-2 \pm \sqrt{4 + 140}}{2} \\
 & = \frac{-2 \pm \sqrt{144}}{2} \\
 & = \frac{-2 \pm 12}{2} \\
 & = \frac{-2 + 12}{2}, \frac{-2 - 12}{2} \\
 & = 5, -7
 \end{aligned}$$

$$\begin{aligned}
 16) \quad & 5x^2 - 6 = 0 \\
 & = \frac{0 \pm \sqrt{0 - 4(5)(-6)}}{10} \\
 & = \frac{0 \pm \sqrt{0 + 120}}{10} \\
 & = \frac{0 \pm \sqrt{120}}{10} \\
 & = \frac{0 \pm \sqrt{4} \sqrt{30}}{10} \\
 & = \frac{0 \pm 2\sqrt{30}}{10} \\
 & = \frac{\pm 2\sqrt{30}}{10} = \frac{\pm \sqrt{30}}{5}
 \end{aligned}$$

$$\begin{aligned}
 17) \quad & x^2 + 1 = x \\
 & x^2 - x + 1 = 0 \\
 & = \frac{1 \pm \sqrt{1 - 4(1)(1)}}{2} \\
 & = \frac{1 \pm \sqrt{-3}}{2} \\
 & = \frac{1 \pm i\sqrt{3}}{2}
 \end{aligned}$$