

Advanced Algebra  
Chapter 5 Review – Part 1

Name \_\_\_\_\_  
Hour \_\_\_\_\_

Simplify.

1.  $\sqrt{-25}$

2.  $\sqrt{-27}$

3.  $\sqrt{-99}$

4.  $(3 + 4i) - (7 - 2i)$

5.  $(3 + 8i) + (5 - 2i)$

6.  $(9 + 6i)(5 - i)$

7.  $(4 + 6i)(2 + i)$

Determine the number <sup>and type</sup> of solutions for the following equations (Show your work):

8.  $x^2 + 6x + 2 = 0$

9.  $-2x^2 + 7x = 10$

10.  $x^2 + 4 = 6x$

Solve and check each quadratic equation.

11.  $9x^2 + 6x + 1 = 4$

12.  $x^2 - 7x = 0$

13.  $x^2 + 2x - 8 = 0$

14.  $(x + 3)^2 = 9$

$$15. 2x^2 - 6x - 8 = 0$$

$$16. x^2 - 5x - 5 = 0$$

$$17. 3x^2 + 8 = 14x$$

$$18. 5x^2 - 25 = 0$$

$$19. x^2 + 8x + 16 = 0$$

$$20. x^2 - 2x + 4 = 0$$

$$21. x^2 - 6x - 9 = 16$$

$$22. -2x^2 + 7x = 10$$

23. A landscape architect designed a garden path such that a grass path of uniform width surrounds a rectangular fountain. The fountain is 60 m long and 40 m wide. The area of the grass path is ~~600~~ <sup>864</sup> sq m. Determine the width of grass path to the nearest hundredth of a meter.

26. A smoke jumper jumps from 1500 ft. The function describing the height is  $y = -16t^2 + 1500$  where  $y$  represents the height in feet and  $t$  represents time in seconds. How long is the jumper in free fall if the parachute opens at 1000 ft?

Advanced Algebra  
Chapter 5 Review - Part 1

Name Key  
Hour \_\_\_\_\_

Simplify.

1.  $\sqrt{-25}$   $\sqrt{25 \cdot -1}$

$5i$

2.  $\sqrt{-27}$   $\sqrt{9 \cdot -1 \cdot 3}$

$3i\sqrt{3}$

3.  $\sqrt{-99}$   $\sqrt{9 \cdot -1 \cdot 11}$

$3i\sqrt{11}$

4.  $(3 + 4i) - (7 - 2i)$  subtract like terms

$-4 + 6i$

5.  $(3 + 8i) + (5 - 2i)$  add like terms

$8 + 6i$

6.  $(9 + 6i)(5 - i)$  FOIL

$45 - 9i + 30i - 6i^2$

$45 + 21i + 6$

$51 + 21i$  and type

7.  $(4 + 6i)(2 + i)$  FOIL

$8 + 4i + 12i + 6i^2$

$8 + 16i - 6$

$2 + 16i$

Determine the number of solutions for the following equations (Show your work):

$b^2 - 4ac$

8.  $x^2 + 6x + 2 = 0$

$b^2 - 4(1)(2)$

$36 - 8$

$28, 2 \text{ real}$

9.  $-2x^2 + 7x = 10$

$-2x^2 + 7x - 10 = 0$

$b^2 - 4(-2)(-10)$

$49 - 80$

$-31, 2 \text{ imag.}$

10.  $x^2 + 4 = 6x$

$x^2 - 6x + 4 = 0$

$(-6)^2 - 4(1)(4)$

$36 - 16$

$20, 2 \text{ real}$

$+$   $\rightarrow$  2 real  
 $0$   $\rightarrow$  1 real  
 $-$   $\rightarrow$  2 imag.

Solve and check each quadratic equation.

Not  $\sqrt{}$

11.  $9x^2 + 6x + 1 = 4$

$9x^2 + 6x - 3 = 0$

$3(3x^2 + 2x - 1) = 0$

$3(3x - 1)(x + 1) = 0$

$3x - 1 = 0$   $x + 1 = 0$

$x = 1/3$

$x = -1$

Not  $\sqrt{}$

13.  $x^2 + 2x - 8 = 0$

$(x + 4)(x - 2) = 0$

$x + 4 = 0$

$x = -4$

$x - 2 = 0$

$x = 2$

Not  $\sqrt{}$

12.  $x^2 - 7x = 0$

$x(x - 7) = 0$

$x = 0$

$x - 7 = 0$

$x = 7$

14.  $\sqrt{(x + 3)^2} = 9$

$x + 3 = \pm 3$

$x = -3 \pm 3$

$x = 0, -6$

Not  $\sqrt{\phantom{x}}$

$$15. 2x^2 - 6x - 8 = 0$$

$$2(x^2 - 3x - 4) = 0$$

$$2(x-4)(x+1) = 0$$

$$x-4=0 \quad x+1=0$$

$$x=4 \quad x=-1$$

Not  $\sqrt{\phantom{x}}$  or Factor

$$16. x^2 - 5x - 5 = 0$$

$$x = \frac{-(-5) \pm \sqrt{(-5)^2 - 4(1)(-5)}}{2(1)}$$

$$x = \frac{5 \pm \sqrt{25+20}}{2}$$

$$x = \frac{5 \pm \sqrt{45}}{2}$$

$$x = \frac{5 \pm 3\sqrt{5}}{2}$$

Not Factor

$$18. 5x^2 - 25 = 0$$

$$5x^2 = 25$$

$$x^2 = 5$$

$$x = \pm \sqrt{5}$$

Not  $\sqrt{\phantom{x}}$

$$17. 3x^2 + 8 = 14x$$

$$3x^2 - 14x + 8 = 0$$

$$(3x-2)(x-4) = 0$$

$$3x-2=0 \quad x-4=0$$

$$x = \frac{2}{3} \quad x = 4$$

Not  $\sqrt{\phantom{x}}$  or Factor

$$20. x^2 - 2x + 4 = 0$$

$$x^2 - 2x = -4$$

$$x^2 - 2x + 1 = -4 + 1$$

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

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

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

Not Factor or  $\sqrt{\phantom{x}}$

$$21. x^2 - 6x - 9 = 16$$

$$x^2 - 6x = 25$$

$$x^2 - 6x + 9 = 25 + 9$$

$$(x-3)^2 = 34$$

$$x-3 = \pm \sqrt{34}$$

$$x = 3 \pm \sqrt{34}$$

Not Factor or  $\sqrt{\phantom{x}}$

$$22. -2x^2 + 7x = 10$$

$$-2x^2 + 7x - 10 = 0$$

$$x = \frac{-7 \pm \sqrt{7^2 - 4(-2)(-10)}}{2(-2)}$$

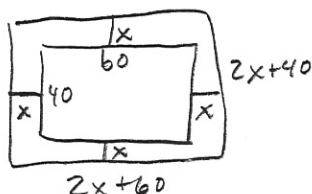
$$x = \frac{-7 \pm \sqrt{49-80}}{-4}$$

$$x = \frac{-7 \pm \sqrt{-31}}{-4}$$

$$x = \frac{-7 \pm i\sqrt{31}}{-4}$$

$$x = \frac{7 \pm i\sqrt{31}}{4}$$

23. A landscape architect designed a garden path such that a grass path of uniform width surrounds a rectangular fountain. The fountain is 60 m long and 40 m wide. The area of the grass path is 864 sq m. Determine the width of the grass path to the nearest hundredth of a meter.



$$(2x+60)(2x+40) = 40 \cdot 60 + 864$$

$$4x^2 + 80x + 120x + 2400 = 2400 + 864$$

$$4x^2 + 200x + 2400 = 3264$$

$$\frac{4x^2}{4} + \frac{200x}{4} - \frac{864}{4} = \frac{0}{4}$$

$$x^2 + 50x - 216 = 0$$

$$(x+54)(x-4) = 0$$

$$x+54=0 \quad x-4=0$$

$$x = -54 \quad x = 4$$

26. A smoke jumper jumps from 1500 ft. The function describing the height is  $y = -16t^2 + 1500$  where  $y$  represents the height in feet and  $t$  represents time in seconds. How long is the jumper in free fall if the parachute opens at 1000 ft?

$$1000 = -16t^2 + 1500$$

$$-500 = -16t^2$$

$$31.25 = t^2$$

$$t = \pm 5.59$$

$$5.59 \text{ sec}$$