

CHAPTER 3 REVIEW

SHOW ALL WORK FOR FULL CREDIT!

For problems 1-2, solve the equation by graphing.

1.  $0 = -x^2 + 2x + 3$   
 $a = -1$   
 $b = 2$   
 $c = 3$   
 Vertex:  $-\frac{b}{2a}$   
 $-\frac{2}{2(-1)} = -\frac{2}{-2} = 1$   
 $-(-1)^2 + 2(1) + 3$   
 $-1 + 2 + 3 = 4$   
 Vertex:  $(1, 4)$   
 Solutions:  $(-1, 0)$  &  $(3, 0)$

2.  $-(x+3)^2 + 1 = 0$   
 Vertex form:  
 vertex:  $(-3, 1)$   
 "a" value =  $-1$   
 Solutions:  $(-4, 0)$  &  $(-2, 0)$

For problems 3-6, solve the equation using square-roots.

3.  $3x^2 - 4 = 8$   
 $+4$   $+4$   
 $3x^2 = 12$   
 $\frac{3x^2}{3} = \frac{12}{3}$   
 $x^2 = 4$   
 $x = 2$  &  $-2$

4.  $(x-6)^2 = 25$   
 $\sqrt{(x-6)^2} = \sqrt{25}$   
 $x-6 = 5$  &  $-5$   
 $+6$   $+6$   $+6$   
 $x = 11$  &  $1$

5.  $4(x-1)^2 + 2 = 10$   
 $-2$   $-2$   
 $4(x-1)^2 = 8$   
 $\frac{4(x-1)^2}{4} = \frac{8}{4}$   
 $(x-1)^2 = 2$   
 $x-1 = \pm\sqrt{2}$   
 $+1$   $+1$   
 $x = 1 \pm \sqrt{2}$

6.  $(x+4)^2 + 4 = 0$   
 $-4$   $-4$   
 $(x+4)^2 = -4$   
 $x+4 = \pm\sqrt{-4}$   
 $x+4 = \pm 2i$   
 $x = -4 \pm 2i$

For problems 7-12, solve the equation by factoring.

7.  $0 = x^2 - 4x + 4$   
 $(x-2)(x-2) = 0$   
 $x-2 = 0$   $x-2 = 0$   
 $x = 2$  &  $2$   
 $x = 2$

8.  $x^2 + x = 6$   
 $-6$   $-6$   
 $x^2 + x - 6 = 0$   
 $(x+3)(x-2) = 0$   
 $x+3 = 0$   $x-2 = 0$   
 $x = -3$   $x = 2$

9.  $m^2 + 4m = 0$   
 $m(m+4) = 0$   
 $m = 0$   $m+4 = 0$   
 $m = 0$   $m = -4$

Common Term

For problems 7-12, solve the equation by factoring.

10.  $x^2 - 121 = 0$

$(x)^2 - (11)^2 = 0$

$(x-11)(x+11) = 0$

$x-11=0 \quad x+11=0$

$x=11 \text{ ; } x=-11$

11.  $9x^2 - 24x + 16 = 0$

$\left(\frac{9x^2}{3x} - \frac{12x}{3x} + \frac{16}{4}\right) = 0$

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

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

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

$x = \frac{4}{3} \text{ ; } x = \frac{4}{3}$

144.1  
72.2  
48.3  
36.4  
24.6  
18.8  
16.9  
(12.12)

12.  $2x^2 - 17x = -30$

$2x^2 - 17x + 30 = 0$

$\left(\frac{2x^2}{2x} - \frac{12x}{2x} + \frac{30}{5}\right) = 0$

$2x(x-6) - 5(x-6) = 0$

$(x-6)(2x-5) = 0$

$x-6=0 \quad 2x-5=0$

$x=6$   
;  
 $x = \frac{5}{2}$

60.1  
30.2  
20.3  
15.4  
(12.5)  
10.6

For problems 13-15, perform the operation on each complex number.

13.  $(-2+3i) + (7-6i)$

$5-3i$

14.  $(9+3i) - (-2-7i)$

$9+3i+2+7i$

$11+10i$

15.  $(3-4i)(3+4i)$

$9+12i-12i-16i^2$

$9+16$

$25$

For problems 16 - 18, solve the equation using the Quadratic Formula.

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

$x^2 - 5x + 2 = 0$

$a=1 \quad b=-5 \quad c=2$

$\frac{5 \pm \sqrt{25 - 4(1)(2)}}{2(1)}$

$2(1)$

$\frac{5 \pm \sqrt{25-8}}{2}$

$2$

$\frac{5 \pm \sqrt{17}}{2}$

17.  $-x^2 + 4x = 5$

$x^2 - 4x + 5 = 0$

$a=1 \quad b=-4 \quad c=5$

$\frac{4 \pm \sqrt{16 - 4(1)(5)}}{2(1)}$

$2(1)$

$\frac{4 \pm \sqrt{16-20}}{2}$

$2$

$\frac{4 \pm \sqrt{-4}}{2}$

$2$

$\frac{4 \pm 2i}{2} \Rightarrow \frac{4}{2} \pm \frac{2i}{2}$

$2 \pm i$

18.  $3x^2 - 12x + 13 = 0$

$a=3 \quad b=-12 \quad c=13$

$\frac{12 \pm \sqrt{144 - 4(3)(13)}}{2(3)}$

$2(3)$

$\frac{12 \pm \sqrt{144-156}}{6}$

$6$

$\frac{12 \pm \sqrt{-12}}{6} \rightarrow \frac{12 \pm \sqrt{12}i}{6}$

$\frac{12 \pm \sqrt{12}i}{6}$

$\frac{12 \pm 2\sqrt{3}i}{6} \rightarrow \frac{12}{6} \pm \frac{2\sqrt{3}i}{6}$

$\frac{12}{6} \pm \frac{2\sqrt{3}i}{6}$

$2 \pm \frac{\sqrt{3}i}{3}$

$\sqrt{12}$   
 $\sqrt{4 \cdot 3}$   
 $2\sqrt{3}$

For problems 19 – 20, solve the equation by completing the square.

19.  $x^2 + 16x + 17 = 0$

$$(x^2 + 16x + 16) + 17 = 0$$

$$(4)^2 = 16$$

$$(x^2 + 16x + 16) + 17 = 0$$

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

$$\sqrt{(x+4)^2} = \sqrt{-1}$$

$$x+4 = \pm i$$

$$-4 -4$$

$$x = -4 \pm i$$

20.  $4x^2 + 16x + 25 = 0$

$$(4x^2 + 16x) + 25 = 0$$

$$4(x^2 + 4x + 4 - 4) + 25 = 0$$

$$(2)^2 = 4$$

$$4(x^2 + 4x + 4) + 9 = 0$$

$$4(x+2)^2 + 9 = 0$$

$$4(x+2)^2 = -9$$

$$\sqrt{(x+2)^2} = \sqrt{-9/4}$$

$$x+2 = \pm \sqrt{-9/4}$$

$$x+2 = \pm \sqrt{9/4} i$$

$$x+2 = \pm \frac{3}{2} i$$

$$x = -2 \pm \frac{3}{2} i$$

Solve the system by the elimination method.

21.  $2x^2 - 8x + y = -5$   
 $2x^2 - 16x - y = -31$

Solve  $\nearrow$

$$4x^2 - 24x = -36$$

$$4x^2 - 24x + 36 = 0$$

$$4(x^2 - 6x + 9) = 0$$

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

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

Now find the y-part

$$x = 3$$

$$(3, 1)$$

$$2x^2 - 8x + y = -5$$

$$x = 3$$

$$2(3)^2 - 8(3) + y = -5$$

$$18 - 24 + y = -5$$

$$-6 + y = -5$$

$$y = 1$$

Solve the system by the substitution method.

22.  $2x^2 - y - 2 = 0$   
 $y = -2x + 2$

Solve  $\nearrow$

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

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

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

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

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

Now find the y-part

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

$$(1, 0) \quad (-2, 6)$$

$$y = -2x + 2$$

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

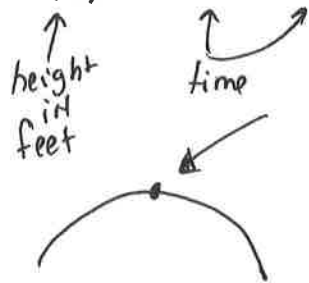
$$y = -2(1) + 2 \quad y = -2(-2) + 2$$

$$-2 + 2 \quad 4 + 2$$

$$0 \quad 6$$

23. A golf ball is hit from the ground, and its height can be modeled by the equation  $h(t) = -16t^2 + 128t$ , where  $h(t)$  represents the height (in feet) of the ball  $t$  seconds after contact. What will the maximum height of the ball be?

$$h(t) = -16t^2 + 128t$$



max height is at the vertex

Vertex  $a = -16 \quad b = 128 \quad c = 0$

$$-\frac{b}{2a} = \frac{-128}{2(-16)} = \frac{-128}{-32} = 4$$

plug in

$$h(t) = -16(4)^2 + 128(4)$$

$$-16(16) + 512$$

$$-256 + 512$$

$$h(t) = 256$$

max height of the golf ball is 256 feet