Ch. 5 Review - Bookwork

p. 393, # 25-32, 45, 53-57 (Day 1)

25) $x^2 - 7x - 8 = 0$
$(x-8)(x+1) = 0$
$x = 8, -1$

26) $x^2 - 5x + 6 = 0$
$(x-3)(x-2) = 0$
$x = 3, 2$

27) $x^2 = 144$
$x = \pm 12$

28) $x^2 - 21x = 0$
$x(x-21) = 0$
$x = 0, 21$

29) $4x^2 - 16x + 16 = 0$
$4(x^2 - 4x + 4) = 0$
$4(x-2)^2 = 0$
$x = 2$

30) $2x^2 + 8x + 6 = 0$
$2(x^2 + 4x + 3) = 0$
$2(x+3)(x+1) = 0$
$x = -3, -1$

31) $x^2 + 14x = 32$
$x^2 + 14x - 32 = 0$
$(x+16)(x-2) = 0$
$x = -16, 2$

32) $9x^2 + 6x + 1 = 0$
$(3x+1)^2 = 0$
$x = -1/3$

45) $x^2 = -81$
$x = \pm\sqrt{-81}$
$x = \pm 9i$

53) $f(x) = x^2 - 3x - 8$
$0 = x^2 - 3x - 8$
$x = \frac{3 \pm \sqrt{(-3)^2 - 4(1)(-8)}}{2(1)}$
$x = \frac{3 \pm \sqrt{9 + 32}}{2}$
$x = \frac{3 \pm \sqrt{41}}{2}$

54) $h(x) = (x-5)^2 + 12$
$0 = (x-5)^2 + 12$
$\sqrt{-12} = \sqrt{(x-5)^2}$
$\pm\sqrt{-12} = x - 5$
$\pm 2i\sqrt{3} = x - 5$
$5 \pm 2i\sqrt{3} = x$

55) $f(x) = 2x^2 - 10x + 18$
$0 = 2(x^2 - 5x + 9)$
$x = \frac{5 \pm \sqrt{(-5)^2 - 4(1)(9)}}{2(1)}$
$x = \frac{5 \pm \sqrt{25 - 36}}{2}$
$x = \frac{5 \pm \sqrt{-11}}{2} = \frac{5 \pm i\sqrt{11}}{2}$

56) $g(x) = x^2 + 3x + 3$

$0 = x^2 + 3x + 3$

$x = \frac{-3 \pm \sqrt{(3)^2 - 4(1)(3)}}{2(1)}$

$x = \frac{-3 \pm \sqrt{9 - 12}}{2}$

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

57) $h(x) = x^2 - 5x + 10$

$0 = x^2 - 5x + 10$

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

$x = \frac{5 \pm \sqrt{25 - 40}}{2}$

$x = \frac{5 \pm \sqrt{-15}}{2} = \frac{5 \pm i\sqrt{15}}{2}$

p. 396, # 7-12 (DAY 1)

7) $x^2 - 2x + 1 = 0$

$(x-1)^2 = 0$

$x = 1$

8) $x^2 + 10x = -21$

$x^2 + 10x + 21 = 0$

$(x+3)(x+7) = 0$

$x = -3, -7$

9) $x^2 + 4x = 12$

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

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

$x = -6, 2$

10) $x^2 - 12x = 25$

$x^2 - 12x - 25 = 0$

$x = \frac{12 \pm \sqrt{(12)^2 - 4(1)(-25)}}{2(1)}$

$x = \frac{12 \pm \sqrt{144 + 100}}{2}$

$x = \frac{12 \pm \sqrt{244}}{2}$ — $\sqrt{4}\sqrt{61}$

$x = \frac{12 \pm 2\sqrt{61}}{2}$

$x = 6 \pm \sqrt{61}$

11) $x^2+25=0$

$x^2=-25$

$x=\pm\sqrt{-25}$

$x=\pm 5i$

12) $x^2+12x=-40$

$x^2+12x+40=0$

$x=\frac{-12\pm\sqrt{(12)^2-4(1)(40)}}{2(1)}$

$x=\frac{-12\pm\sqrt{144-160}}{2}$

$x=\frac{-12\pm\sqrt{-16}}{2}=\frac{-12\pm 4i}{2}$

$x=-6\pm 2i$

p. 391, # 1-6, 10-25 (DAY 2)

1) $y>-x^2+6x$

$x=\frac{-6}{2(-1)}=3$

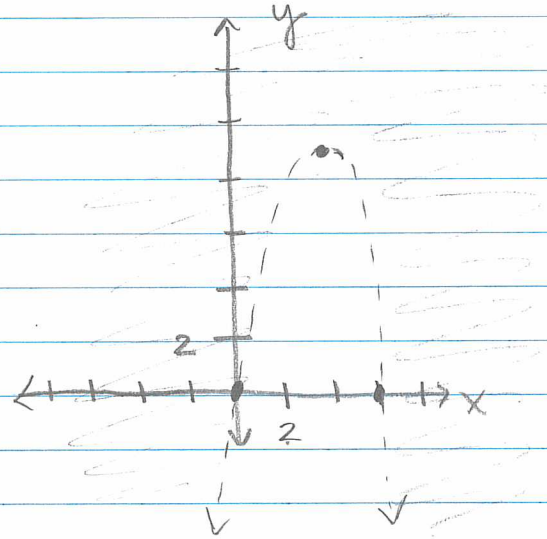
$y=-(3)^2+6(3)$

$y=9$

$V(3,9)$

Xint: $-x(x-6)$

$x=0,6$



2) $y\leq -x^2-x+2$

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

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

$x=-2,1$

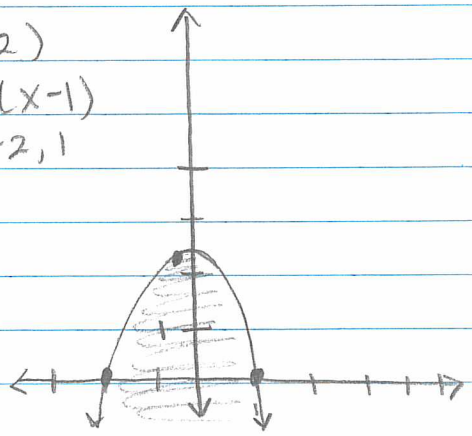
$x=\frac{-(-1)}{2(-1)}=\frac{1}{-2}$

$y=-(-1/2)^2-(-1/2)+2$

$y=-1/4+1/2+2$

$y=1/4+2=9/4$

$V(-1/2, 9/4)$

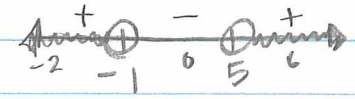


3) $x^2-4x+1>6$

$x^2-4x-5>0$ pos.

$(x-5)(x+1)>0$

$x=5,-1$



$(-\infty,-1),(5,\infty)$

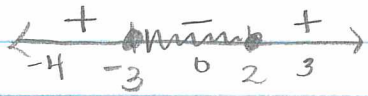
4) $2x^2+2x-10\leq 2$

$2x^2+2x-12\leq 0$ neg.

$2(x^2+x-6)\leq 0$

$2(x+3)(x-2)\leq 0$

$x=-3,2$



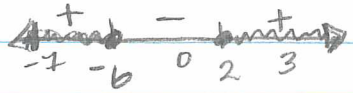
$[-3,2]$

5) $x^2+4x-7\geq 5$

$x^2+4x-12\geq 0$ pos.

$(x+6)(x-2)\geq 0$

$x=-6,2$

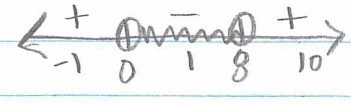


$(-\infty,-6],[2,\infty)$

6) $x^2-8x<0$ neg.

$x(x-8)<0$

$x=0,8$



$(0,8)$

10) $y=x^2-4x+4$

11) $y=-x^2+5x-1$

12) $y=-127.5x^2+961.5x+5474.5$

13) ≈ 6337 lbs.

14) ≈ 5007 lbs

15) $|-6i|=\sqrt{0^2+(-6)^2}=\sqrt{36}=6$

16) $|3+4i|=\sqrt{3^2+4^2}=\sqrt{25}=5$

17) $|2-i|=\sqrt{2^2+(-1)^2}=\sqrt{5}$

18) $(3-5i)-(6-i)=-3-4i$

19) $(-6+4i)+(7-2i)=1+2i$

20) $3i(4+i)=12i+3i^2$

$=-3+12i$

21) $(3+i)(5-i)=15-3i+5i-i^2$

$=16+2i$

22) $(1-4i)(1+4i)=1+\cancel{4i}\cancel{-4i}-16i^2$

$=17$

23) $3i^{15}=3i^3=3(-i)=-3i$

24) $\frac{2-7i}{-i}\cdot\frac{i}{i}=\frac{2i-7i^2}{-i^2}=7+2i$

25) $\frac{3-i}{4-2i}\cdot\frac{4+2i}{4+2i}=\frac{12+6i-4i-2i^2}{16+\cancel{8i}\cancel{-8i}-4i^2}=\frac{14+2i}{20}=\frac{7+i}{10}$

p. 394, # 64-95 (Day 2)

64) $y > x^2 + 3x + 4$ y int (0, 4)

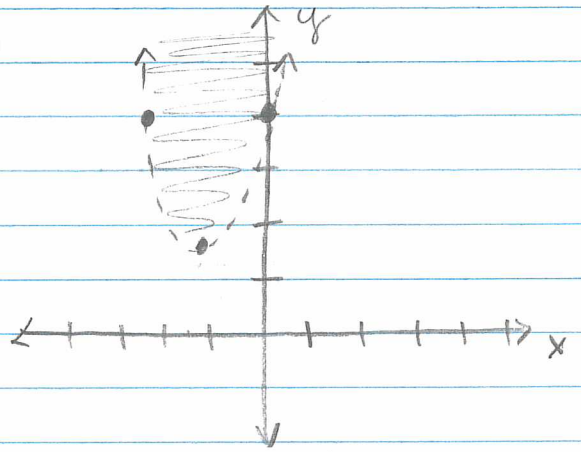
$x = \frac{-3}{2(1)} = -\frac{3}{2}$

$y = (-3/2)^2 + 3(-3/2) + 4$

$y = 9/4 - 9/2 + 4$

$y = -9/4 + 4$

$y = 7/4$



65) $y \leq 2x^2 - x - 5$ y int (0, -5)

$x = \frac{1}{2(2)} = 1/4$

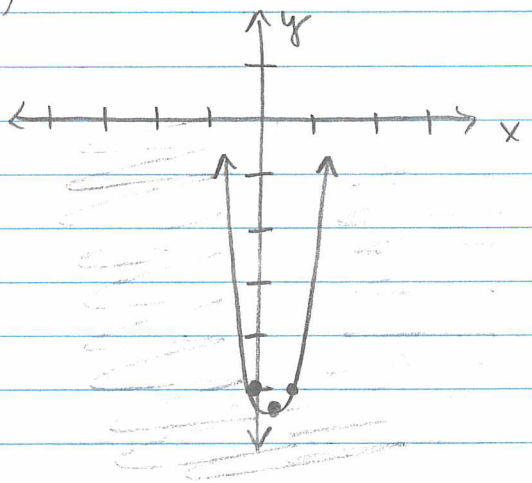
$y = 2(1/4)^2 - 1/4 - 5$

$y = 2/16 - 1/4 - 5$

$y = 1/8 - 2/8 - 5$

$y = -1/8 - 5$

$y = -41/8$

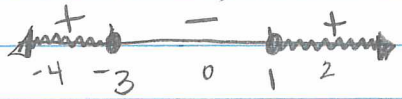


66) $x^2 + 2x - 4 \geq -1$ pos.

$x^2 + 2x - 3 \geq 0$

$(x+3)(x-1) \geq 0$

$x = -3, 1$



$(-\infty, -3], [1, \infty)$

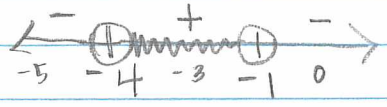
67) $-x^2 - 5x > 4$ pos.

$-x^2 - 5x - 4 > 0$

$-(x^2 + 5x + 4) > 0$

$-(x+4)(x+1) > 0$

$x = -4, -1$



$(-4, -1)$

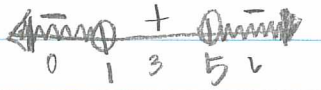
68) $-x^2+6x<5$ neg

$-x^2+6x-5<0$

$-(x^2-6x+5)<0$

$-(x-5)(x-1)<0$

$x=5 \quad x=1$



$(-\infty,1),(5,\infty)$

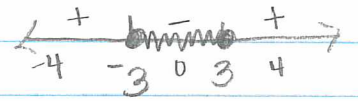
69) $3x^2-25 \leq 2$

$3x^2-27 \leq 0$ neg

$3(x^2-9) \leq 0$

$3(x-3)(x+3) \leq 0$

$x=3 \quad x=-3$

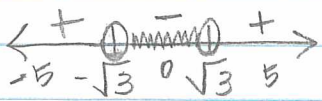


$[-3,3]$

70) $x^2-3<0$ neg

$x^2=3$

$x=\pm\sqrt{3}$



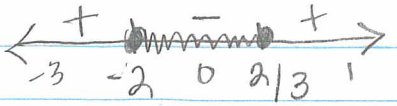
$(-\sqrt{3},\sqrt{3})$

71) $3x^2+4x-3 \leq 1$

$3x^2+4x-4 \leq 0$ neg

$(3x-2)(x+2) \leq 0$

$x=2/3 \quad x=-2$



$[-2,2/3]$

72) $y=-x^2-3x+6$

73) $y=-2x^2+x$

74) $y=0.000168x^2-0.0112x+0.182$

75) ≈ 0.074 in

76) $y=0.36x^2-11.9x+105$

77) ≈ 37.8 ohms

78) $|3i|=\sqrt{0^2+(3)^2}=\sqrt{9}=3$

79) $|4-2i|=\sqrt{4^2+(-2)^2}=\sqrt{16+4}$
$=\sqrt{20}=2\sqrt{5}$

80) $|12-16i|=\sqrt{(12)^2+(-16)^2}$
$=\sqrt{144+256}=\sqrt{400}=20$

81) $|7i|=\sqrt{0^2+7^2}=\sqrt{49}=7$

82) $(1+5i)+(6-i)=7+4i$

83) $(9+4i)-(3+2i)=6+2i$

84) $(5-i)-(11-i)=-6$

85) $-5i(3-4i)=-15i+20i^2$
$=-15i-20$
$=-20-15i$

86) $(5-2i)(6+8i)=30+40i-12i-16i^2$
$=46+28i$

87) $(3+2i)(3-2i)$

$9-6i+6i-4i^2$

$9+4$

13

88) $(4+i)(1-5i)$

$4-20i+i-5i^2$

$9-19i$

89) $(-7+4i)(3+9i)$

$-21-63i+12i+36i^2$

$-57-51i$

90) $i^{32} = i^0 = 1$

91) $-5i^{21} = -5i^1 = -5i$

92) $\frac{2+9i}{-2i} \cdot \frac{2i}{2i} = \frac{4i+18i^2}{-4i^2} = \frac{-18+4i}{4} = \frac{-9+2i}{2}$

93) $\frac{5+2i}{3-4i} \cdot \frac{3+4i}{3+4i} = \frac{15+20i+6i+8i^2}{9+12i-12i-16i^2} = \frac{7+26i}{25}$

94) $\frac{8-4i}{1+i} \cdot \frac{1-i}{1-i} = \frac{8-8i-4i+4i^2}{1-i+i-i^2} = \frac{4-12i}{2} = 2-6i$

95) $\frac{-12+26i}{2+4i} \cdot \frac{2-4i}{2-4i} = \frac{-24+48i+52i-104i^2}{4-8i+8i-16i^2} = \frac{80+100i}{20}$

$= 4+5i$

p. 396, # 18-26 (Day 2)

18) $y < x^2 - 3x - 4$

$x = \frac{3}{2(1)} = \frac{3}{2}$

$y = (\frac{3}{2})^2 - 3(\frac{3}{2}) - 4$

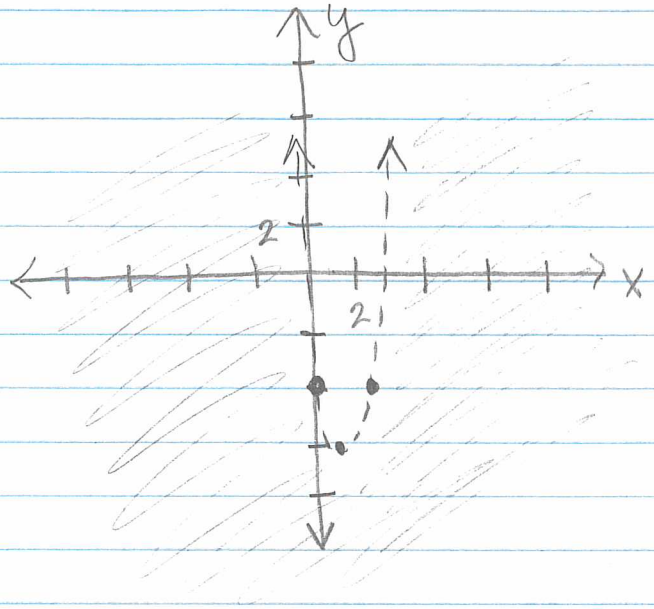
$y = \frac{9}{4} - \frac{9}{2} - 4$

$y = \frac{9}{4} - \frac{18}{4} - \frac{16}{4}$

$y = -\frac{25}{4}$

$V(3/2, -25/4)$

$y\text{int}(0, -4)$



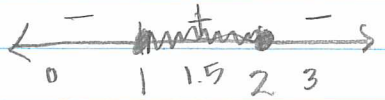
19) $-x^2 + 3x + 5 \geq 7$

$-x^2 + 3x - 2 \geq 0$ pos.

$-(x^2 - 3x + 2) \geq 0$

$-(x-2)(x-1) \geq 0$

$x = 2 \quad x = 1$



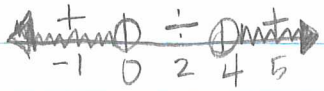
$[1, 2]$

20) $x^2 - 4x + 1 > 1$

$x^2 - 4x > 0$ pos.

$x(x-4) > 0$

$x = 0, 4$



$(-\infty, 0), (4, \infty)$

21) $y = 1.8x^2 + 52x - 662$

22) $\approx \$4697$

23) $(12 - i) - (5 + 2i)$

$7 - 3i$

24) $(6 - 2i)(2 - 2i)$

$12 - 12i - 4i + 4i^2$

$8 - 16i$

25) $-2i^{18} = -2 \cdot i^2 = 2$

26) $\frac{1 - 8i}{4i} \cdot \frac{-4i}{-4i} = \frac{-4i + 32i^2}{-16i^2}$

$= \frac{-32 - 4i}{16} = \frac{-8 - i}{4}$