4-7 HOMEWORK
solutions

1) a) $x^2 - 5x - 7 = 0$

$a = 1$, $b = -5$, $c = -7$

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

$$x = \frac{5 \pm \sqrt{(-5)^2 - 4 \cdot 1 \cdot (-7)}}{2 \cdot 1}$$

$$x = \frac{5 \pm \sqrt{25 + 28}}{2}$$

$$\boxed{x = \frac{5 \pm \sqrt{53}}{2}}$$

prime number cannot be simplified

b) $2x^2 - 5x - 3 = 0$

$a = 2$, $b = -5$, $c = -3$

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

$$x = \frac{5 \pm \sqrt{(-5)^2 - 4 \cdot 2(-3)}}{2 \cdot 2}$$

$$x = \frac{5 \pm \sqrt{25 + 24}}{4}$$

$$x = \frac{5 \pm \sqrt{49}}{4}$$

$\frac{5+7}{4}$ or $\frac{5-7}{4}$

$$x = \frac{12}{4} \text{ or } \frac{2}{4}$$

$$\boxed{x = 3 \text{ or } \frac{1}{2}}$$

2) a) discriminant

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

$a = -2$, $b = -3$, $c = 7$

$b^2 - 4ac$

$(-3)^2 - 4(-2) \cdot 7$

$9 + 8 \cdot 7$

$9 + 56$

65

positive

2 REAL SOLUTIONS

b) discriminant

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

$a = 1$, $b = -6$, $c = 9$

$b^2 - 4ac$

$(-6)^2 - 4 \cdot 1 \cdot 9$

$36 - 36$

$= 0$

zero

one REAL solution

4-7 cont.

3) $y = -1000x^2 + 1100x - 2.5$

$200 = -1000x^2 + 1100x - 2.5$

-200

$0 = -1000x^2 + 1100x - 202.5$

$a = -1000$
$b = 1100$
$c = -202.5$

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

$$= \frac{-1100 \pm \sqrt{1100^2 - 4(-1000)(-202.5)}}{2(-1000)}$$

$$= \frac{-1100 \pm \sqrt{400000}}{-2000} = \frac{-1100 \pm 632.456}{-2000}$$

$$= \frac{-1100 - 632.456}{-2000} \quad \text{or} \quad \frac{-1100 + 632.456}{-200}$$

$= 0.866 = 0.87$ OR $= 0.2337 = 0.23$

↑ the highest price

4-8 HOMEWORK

1) a) $\sqrt{-75} = \sqrt{-25 \cdot 5} = \boxed{5\sqrt{5}\,i}$

b) $\sqrt{-216} = \sqrt{-\underline{2 \cdot 2} \cdot 2 \cdot \underline{3 \cdot 3} \cdot 3} = 2 \cdot 3\sqrt{2 \cdot 3}\,i$

(PAIR, PAIR)

$= \boxed{6\sqrt{6}\,i}$

c) $(4 - 2i) - (3 + i)$

$4 - 2i - 3 - i = \boxed{1 - 3i}$

d) $(2 + i)(4 - 5i) =$

	2	i
4	8	$4i$
$-5i$	$-10i$	$-5i^2$ (+5)

$\boxed{13 - 6i}$

e) $\dfrac{9 + 12i}{3i} \cdot \dfrac{i}{i}$

$= \dfrac{9i + 12i^2}{3i^2}$

$= \dfrac{9i - 12}{-3}$

$= -3i + 4$

$= \boxed{4 - 3i}$

f) $(9 + 4i)^2$

$(a + b)^2 = a^2 + 2ab + b^2$

$= 9^2 + 2 \cdot 9 \cdot 4i + (4i)^2$

$= 81 + 72i + 16i^2 - 16$

$= \boxed{65 + 72i}$

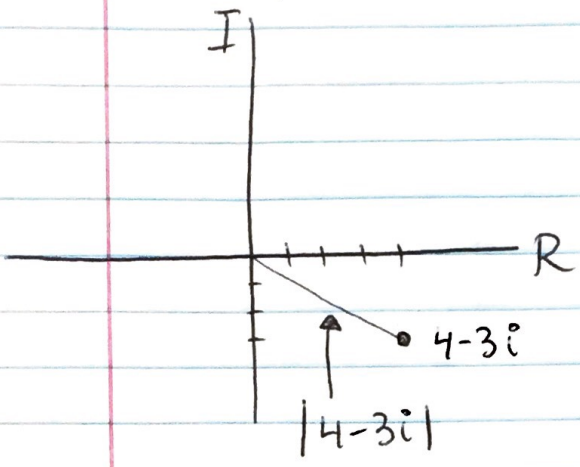
this question could also be done using FOIL or Box Method

	9	$4i$
9		
$4i$		

4-8 cont.

2) $|4-3i| = \sqrt{4^2+3^2} = \sqrt{16+9}$

$= \sqrt{25} = 5$



3) a) $x^2+16=0$

$\sqrt{x^2} = \sqrt{-16}$

$\boxed{x = \pm 4i}$

b) $2x^2-4x=-7$

$2x^2-4x+7=0$

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

$x = \dfrac{4 \pm \sqrt{(-4)^2-4\cdot 2\cdot 7}}{2\cdot 2}$

$x = \dfrac{4 \pm \sqrt{16-56}}{4}$

$x = \dfrac{4 \pm \sqrt{-40}}{4}$

$x = \dfrac{4 \pm 2\sqrt{10}\,i}{4}$

$\boxed{x = 1 \pm \frac{\sqrt{10}}{2} i}$

4) the error is that $7i \cdot (-7i)$ should say $-49i^2$, not $49i^2$

correction $(4+7i)(4-7i)$

$= 16 + 28i - 28i - 49i^2$

$= 16 + 49$

$= \boxed{65}$

4-9 Solutions

1) $\begin{cases} y = x+1 \\ y = -x^2 - 2x + 3 \end{cases}$

$x + 1 = -x^2 - 2x + 3$

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

$0 = -(x^2 + 3x - 2)$ cannot factor, use quadratic formula!

$0 = -x^2 - 3x + 2 \quad a = -1 \quad b = -3 \quad c = 2$

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

$$= \frac{3 \pm \sqrt{9 + 8}}{-2} = \frac{3 \pm \sqrt{17}}{-2}$$

$$x_1 = \frac{3 + \sqrt{17}}{-2} \qquad x_2 = \frac{3 - \sqrt{17}}{-2}$$

$$y_1 = \frac{3 + \sqrt{17}}{-2} + 1 \qquad y_2 = \frac{3 - \sqrt{17}}{-2} + 1$$

4-9 cont.

2) $\begin{cases} y = x - 2 \\ y = 2x^2 - 5x + 2 \end{cases}$

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

$\quad -x \quad +2$

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

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

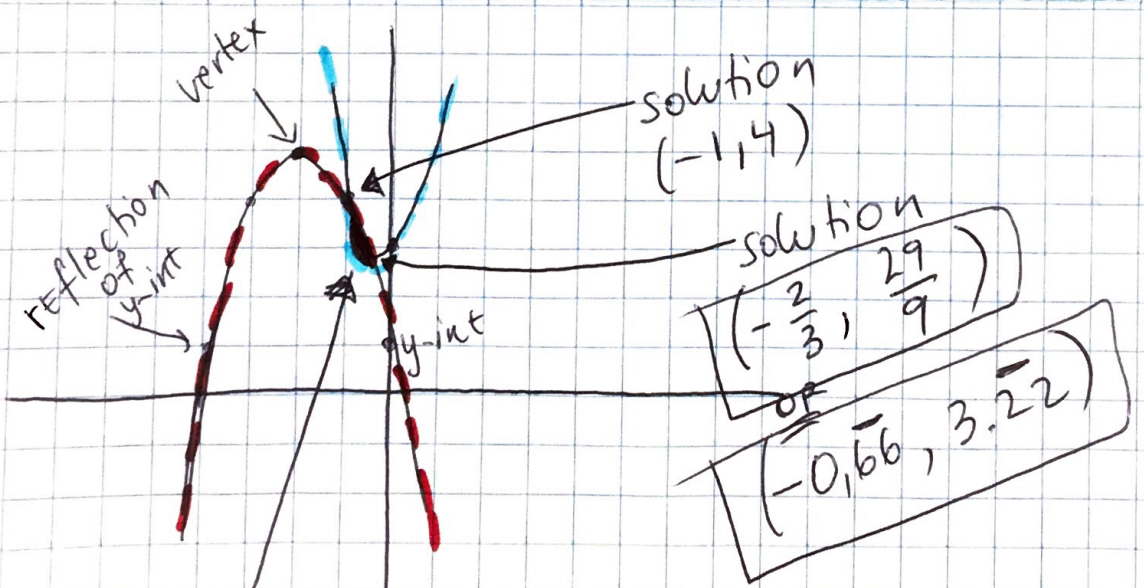
$0 = 2(x-2)(x-1)$

$x_1 = 2$ $\quad$ $x_2 = 1$

$y_1 = 2 - 2$ $\quad$ $y_2 = 1 - 2$

$y_2 = 0$ $\quad$ $y_2 = -1$

3) $y > 2x^2 + x + 3 \qquad y < -x^2 - 4x + 1$

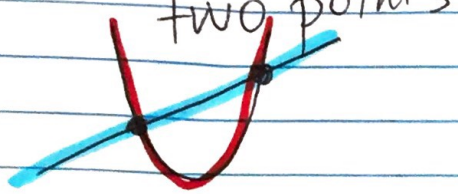


Inequality solution | is any point between these two curves

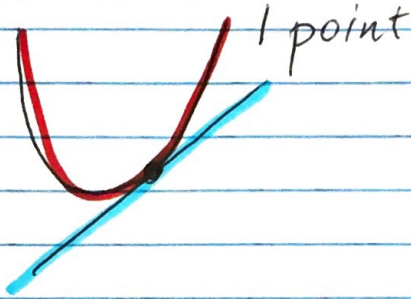
4-9 cont

4) a) linear and quadratic

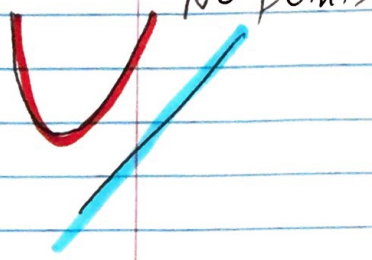
possibility 1



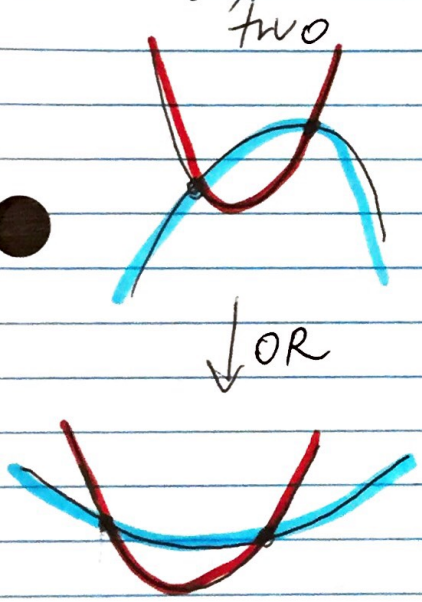
possibility 2

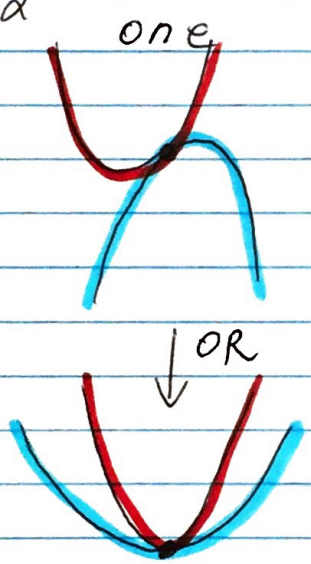


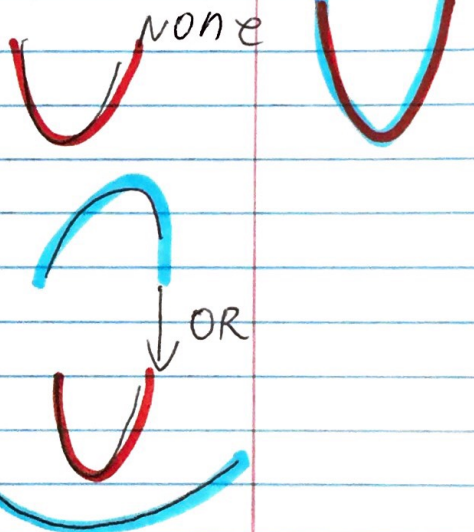
possibility 3



b) two quadratic







c) linear and absolute value