

Chapt Review

$$\textcircled{1} -1-i$$

$$\textcircled{2} 6i+3i^2 = -3+6i$$

$$\textcircled{3} (1+i)(4-3i) = 4-3i+4i-3i^2$$
$$\boxed{7+i}$$

$$\textcircled{4} \frac{1+i}{1-i} \frac{1+i}{1+i} = \frac{1+2i+i^2}{1-i^2} = \frac{2i}{2} = \boxed{i}$$

$$\textcircled{5} 5i\sqrt{3} - 2i\sqrt{3} = \boxed{3i\sqrt{3}}$$

$$\textcircled{6} (2-i\sqrt{3})(2-i\sqrt{3}) = 4-2i\sqrt{3}-2i\sqrt{3}+3i^2$$
$$\boxed{+1-4i\sqrt{3}}$$

$$\textcircled{7} x(2x-3) = -4$$

$$2x^2 - 3x = -4$$

$$2x^2 - 3x + 4 = 0$$

$$\frac{3 \pm \sqrt{9 - 4(2)(4)}}{4}$$

$$\frac{3 \pm \sqrt{-23}}{4}$$

$$\boxed{\frac{3 \pm i\sqrt{23}}{4}}$$

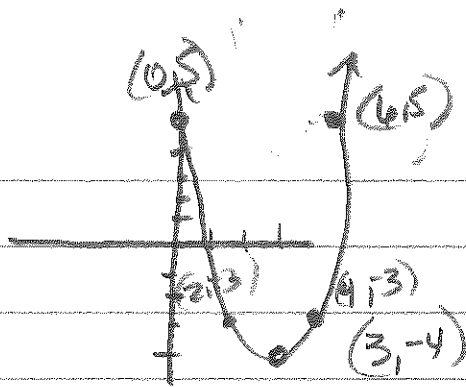
$$(x-3)^2 = 4$$

$$x-3 = \pm 2$$

8) $F(x) = (x-3)^2 - 4$

$$D: (-\infty, \infty)$$

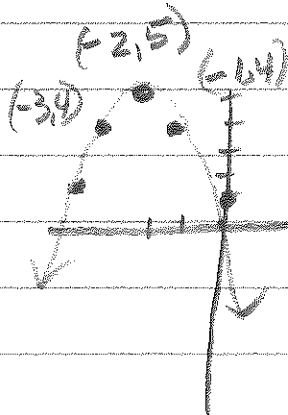
$$R: [-4, \infty)$$



9) $F(x) = -(x+2)^2 + 5$

$$D: (-\infty, \infty)$$

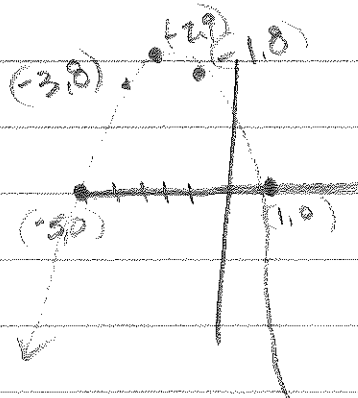
$$R: (-\infty, 5]$$



10) $F(x) = -x^2 - 4x + 5$

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

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



$$x = \frac{-b}{2a}$$

$$x = -2$$

11) $3x^2 - 6x + 1$

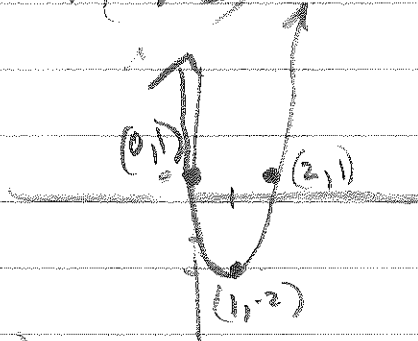
$$x = \frac{6}{6} = 1$$

$$\sqrt{1^2 - 2}$$

$$\frac{6 \pm \sqrt{36 - 4(3)(1)}}{6}$$

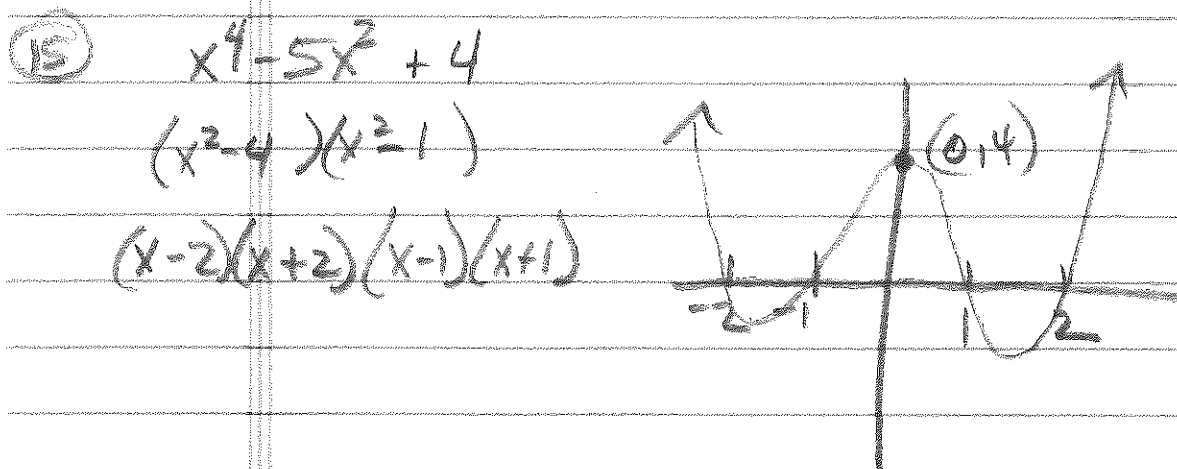
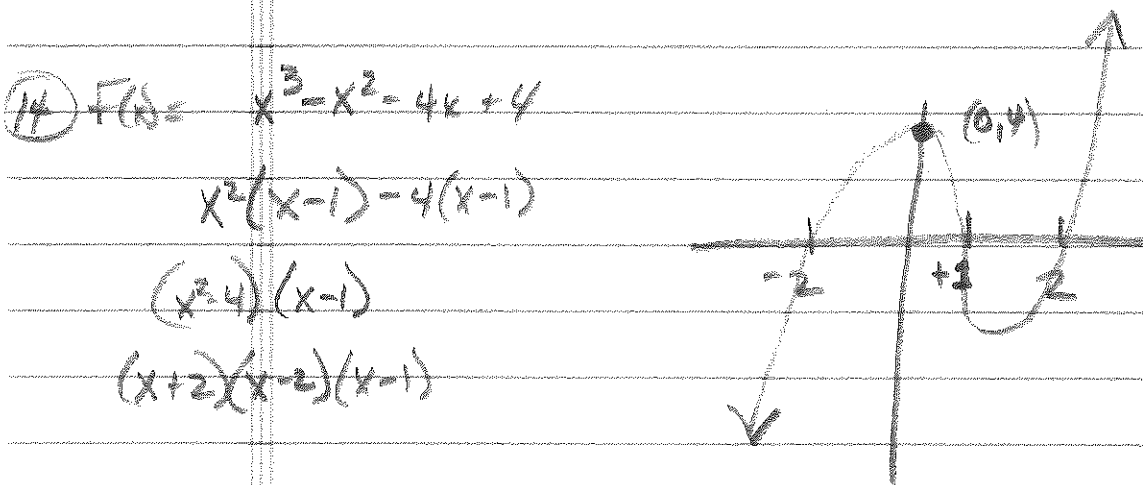
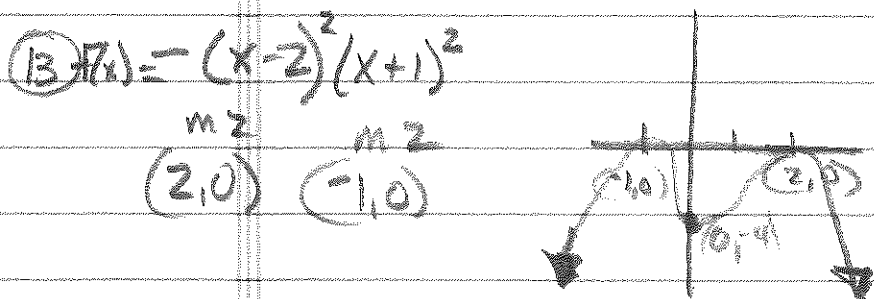
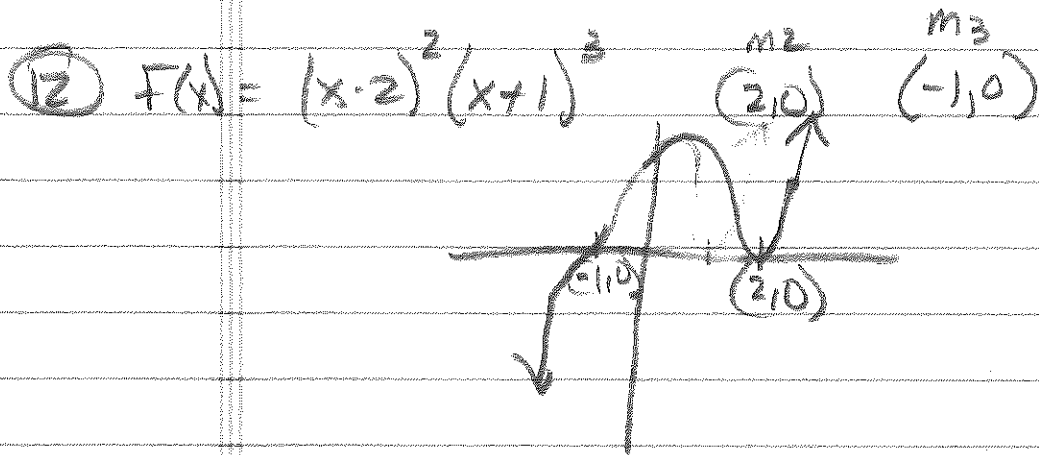
$$\frac{6 \pm 2\sqrt{6}}{6}$$

$$1 \pm \frac{\sqrt{6}}{3}$$

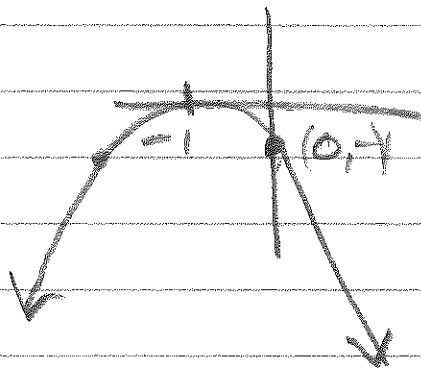


$$D: (-\infty, \infty)$$

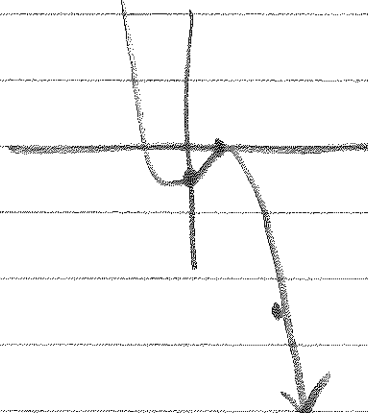
$$R: [2, \infty)$$



16) $-(x+1)^6$
 m.c.
 $(-1, 0)$



17) $-6x^3 + 7x^2 - 1$



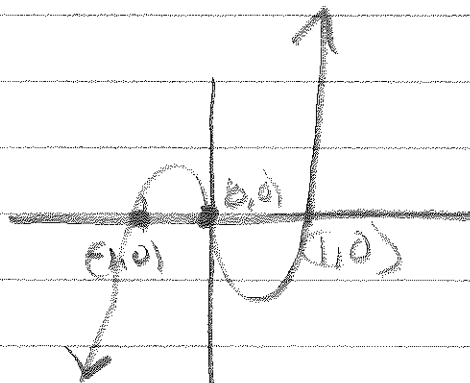
x	y
0	-1
1	0
-1	12
2	-21
-2	75

18) $2x^3 - 2x$

$2x(x^2 - 1)$

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

$(0, 0) (1, 0) (-1, 0)$



19) $x^3 - 2x^2 + 26x$

$x(x^2 - 2x + 26)$

$(0, 0) 1 \pm 5i$

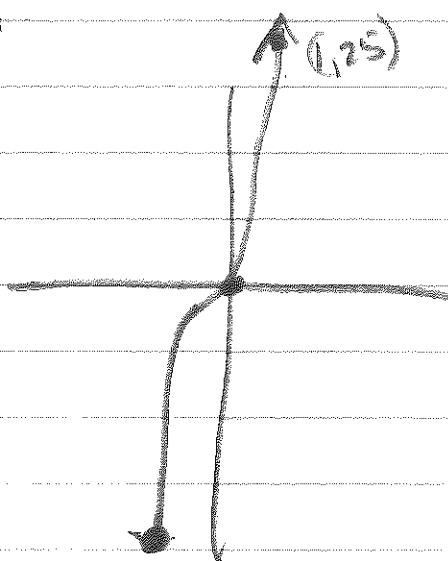
$(1+5i, 0)$

$(1-5i, 0)$

$\frac{2 \pm \sqrt{4 - 4(1)(26)}}{2}$

$\frac{2 \pm \sqrt{100}}{2}$

$2 \pm 10i$



$$P \neq \pm 1 \neq 3$$

$$(20) \quad -x^3 + 5x^2 - 5x - 3$$

$$Q \neq \pm 1$$

$$P/Q \neq \pm 1 \neq 3$$

$$\begin{array}{r} 3 \overline{) -1 \ 5 \ -5 \ -3} \\ \underline{-3 \ 6 \ 3} \\ -1 \ 2 \ +1 \ 0 \end{array}$$

$$(3, 0) \quad (1 + \sqrt{2}, 0) \quad (1 - \sqrt{2}, 0)$$

$$-x^2 + 2x + 1$$

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

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

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

$$1 \pm \sqrt{2}$$

$$(21) \quad x^3 + 0x^2 - 3x + 2 = 0$$

$$\begin{array}{r} P \neq \pm 1 \neq 2 \neq 3 \\ Q \neq \pm 1 \end{array} \quad \begin{array}{r} 1 \ 0 \ -3 \ 2 \\ \underline{1 \ 1 \ -2 \ 0} \\ 0 \ 1 \ -1 \ 2 \end{array}$$

$$\begin{array}{l} MZ \\ (1, 0) \quad (-2, 0) \end{array}$$

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

$$(22) \quad 6x^3 - 11x^2 + 6x - 1$$

$$P \neq \pm 1$$

$$Q \neq \pm 1 \neq 2 \neq 6$$

$$P/Q \neq \pm 1 \neq \frac{1}{2} \neq \frac{1}{6}$$

$$\begin{array}{r} 6 \ -11 \ 6 \ -1 \\ \underline{6 \ 5 \ 1 \ 0} \\ 0 \ -5 \ 5 \ 1 \end{array}$$

$$(1, 0) \\ (\frac{1}{2}, 0) \\ (\frac{1}{3}, 0)$$

$$6x^2 - 5x + 1 \quad \frac{5 \pm \sqrt{25 - 4(6)(1)}}{12}$$

$$\frac{5 \pm 1}{12} = \frac{6}{12} \text{ or } \frac{4}{12}$$

$$\textcircled{23} \quad (2x+1)(3x-2)^3(2x-7) = 0$$

$$\left(-\frac{1}{2}, 0\right) \left(\frac{2}{3}, 0\right) \left(\frac{7}{2}, 0\right)$$

$$\textcircled{24} \quad 2x^3 + 5x^2 - 200x - 500$$

$$P_3 \pm 1 \pm 2 \pm 5 \pm 10 \pm 25 \pm 50 \pm 100 \pm 125 \pm 500$$

± 4
 ± 20
 ± 250

$$Q_3 \pm 1 \pm 2$$

$$P/Q_3 \pm 1 \pm 2 \pm 4 \pm 5 \pm 10 \pm 20 \pm 25 \pm 50 \pm 100 \pm 125 \pm 250 \pm 500$$

$$\pm \frac{1}{2} \pm \frac{5}{2} \pm \frac{25}{2} \pm \frac{125}{2}$$

$$-10 \overline{) \begin{array}{r} 2x^3 + 5x^2 - 200x - 500 \\ \underline{-2x^2 - 20x} \\ 2x^2 - 15x - 500 \\ \underline{-2x^2 - 15x} \\ 0 \end{array}}$$

$$-100 \quad 2x^2 - 15x - 50$$

$$(2x-20)(2x+5)$$

$$(x-10)(2x+5)$$

$$\boxed{(10, 0) \left(-\frac{5}{2}, 0\right) (-10, 0)}$$

(25) $x^4 - x^3 - 11x^2 = x + 12$

$x^4 - x^3 - 11x^2 - x - 12 = 0$

$P'_s \pm 1 \pm 2 \pm 3 \pm 4 \pm 6 \pm 12$

$Q \pm 1$

P/Q Same as P'_s

$$\begin{array}{r|rrrrr} -3 & 1 & -1 & -11 & -1 & -12 \\ \hline & \downarrow & -3 & 12 & -3 & 12 \\ 4 & 1 & -4 & 1 & -4 & 0 \\ \hline & \downarrow & 4 & 0 & 4 & \\ & 1 & 0 & 1 & 0 & \end{array}$$

$x^2 + 1 = 0$

$x^2 = -1$

$x = \pm i$

$(-3, 0) (4, 0) (i, 0) (-i, 0)$

(26) $2x^4 + x^3 - 17x^2 - 4x + 6 = 0$

$P'_s \pm 1 \pm 2 \pm 3 \pm 6$

$Q'_s \pm 1 \pm 2$

$P/Q'_s \pm 1 \pm 2 \pm 3 \pm 6$

$\pm 1/2 \pm 3/2$

$$\begin{array}{r|rrrrr} -3 & 2 & 1 & -17 & -4 & 6 \\ \hline & \downarrow & -6 & 15 & 6 & -6 \\ 1/2 & 2 & -5 & -2 & 2 & 0 \\ \hline & \downarrow & 1 & -2 & -2 & \\ & 2 & -4 & -4 & 0 & \end{array}$$

$2x^2 - 4x - 4$

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

$(-3, 0) (1/2, 0) (1 + \sqrt{3}, 0) (1 - \sqrt{3}, 0)$

$\frac{4 \pm 4\sqrt{3}}{4}$

$1 \pm \sqrt{3}$

$$(27) P(x) = -x^2 + 150x - 4425$$

$$x = \frac{-150}{-2}$$

$$x = (75, 1200)$$

plug in 75 for x

75 cabinets made will maximize profits at \$1200

$$(28) x + y = -18$$

$$xy = \text{max}$$

$$x = -18 - y$$

$$(-18 - y)y = \text{max}$$

$$-18y - y^2 = \text{max}$$

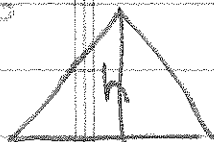
$$\frac{18}{-2} = \boxed{y = -9}$$

$$x = -18 - (-9) =$$

$$\boxed{x = -9}$$

$$\boxed{xy = 81}$$

(29)



$$40 - 2h$$

20

$$= \frac{1}{2}(40 - 2h)(h)$$

$$(20 - h)(h)$$

$$20h - h^2$$

$$h = \frac{-20}{-2}$$

$$h = 10$$

$$40h - 2h^2$$

$$-40$$

$$\boxed{100 \text{ in}^2}$$

$$\frac{2x^2 - x - 3}{3x^2 - 1} \cdot \frac{x+1}{x+1}$$

30) $\frac{2x^2 - x - 3}{3x^2 - 1} \cdot \frac{x+1}{x+1}$

$$\frac{6x^4 - 3x^3 - 11x^2 + 2x + 4}{6x^4 + 6x^3 - 2x^2}$$

$$\frac{-3x^3 - 9x^2 + 2x}{6x^4 + 6x^3 - 2x^2}$$

$$\frac{-3x^3 + 0x + x}{6x^4 + 6x^3 - 2x^2}$$

$$\frac{-9x^2 + x + 4}{6x^4 + 6x^3 - 2x^2}$$

$$\frac{-9x^2 + 0x + 3}{6x^4 + 6x^3 - 2x^2}$$

$$\frac{x+1}{6x^4 + 6x^3 - 2x^2}$$

31)

4	2	-13	17	18	-24
	↓	8	-20	-12	24
	2	-5	-3	6	0

$$2x^3 - 5x^2 - 3x + 6$$

32) 3rd $f(x) = a(x-1)(x-i)(x+i)$

$f(-1) = 8$

$$8 = a(-2)(1-i)(-1+i)$$

$$8 = a(-2)(1-i^2)$$

$$8 = a(-2)(2)$$

$$8 = -4a$$

$$-2 = a$$

$$f(x) = -2(x-1)(x-i)(x+i)$$

33) 4th $f(x) = a(x-2)^2(x-3i)(x+3i)$

$f(0) = 36$

$$36 = a(-2)^2(-3i)(3i)$$

$$36 = a(4)(-9i^2)$$

$$36 = 13a$$

$$36/13 = a$$

$$f(x) = \frac{36}{13}(x-2)^2(x-3i)(x+3i)$$

34) $x^3 - x - 5$

$f(1) = -5$

$f(2) = 1$

yes has root between

$1 + 2$