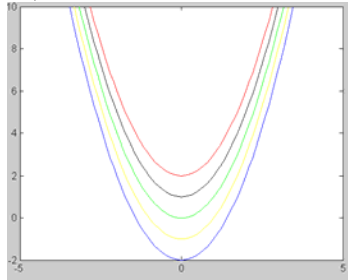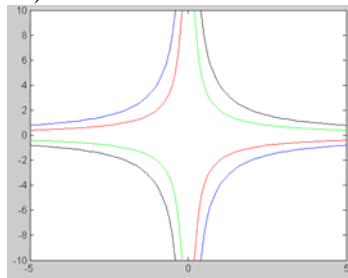## Section 8.1

6) $f(0,0) = 0$; $f(0,1) = 0$

$f(1,1) = e^2$; $f(-1,-1) = e^2$

20)

22)

Section 8.2

6) $\dfrac{\partial f}{\partial x} = \dfrac{1}{1+y}$ $\dfrac{\partial f}{\partial y} = -\dfrac{x}{(1+y)^2}$

8) $\dfrac{\partial f}{\partial x} = \dfrac{4xy^2}{(x^2+y^2)^2}$ $\dfrac{\partial f}{\partial y} = -\dfrac{4x^2 y}{(x^2+y^2)^2}$

12) $\dfrac{\partial f}{\partial x} = \sqrt{1+y^2}$ $\dfrac{\partial f}{\partial y} = \dfrac{xy}{\sqrt{1+y^2}}$

16) $\dfrac{\partial f}{\partial x} = 2xe^{y^2}$ $\dfrac{\partial f}{\partial y} = 2x^2 y e^{y^2}$

30) $\dfrac{\partial f}{\partial x}(0,e) = 1$ $\dfrac{\partial f}{\partial y}(0,e) = \dfrac{1}{e}$

38) $f_{xx} = -\dfrac{y}{4x^{\frac{3}{2}}}$ $f_{yy} = -\dfrac{x}{4y^{\frac{3}{2}}}$

$f_{xy} = f_{yx} = \dfrac{1}{2y^{\frac{1}{2}}} + \dfrac{1}{2x^{\frac{1}{2}}}$

40) $f_{xx} = \dfrac{2y^2 - 2x^2 y^4}{(1+x^2 y^2)^2}$ $f_{yy} = \dfrac{2x^2 - 2x^4 y^2}{(1+x^2 y^2)^2}$

$f_{xy} = f_{yx} = \dfrac{4xy}{(1+x^2 y^2)^2}$

Section 8.2 (con't)

42) (a) 48 units/unit change in labor:

$\dfrac{128}{81}$ units/unit change in capital

(b) No

Section 8.3

2) (0,0) is a relative minimum;

6) (6,4) is a saddle point

8) No critical points

14) $(0,-1)$ is a saddle point

20) $\left(2,-\dfrac{1}{2}\right)$ is a saddle point

22) 1,071 deluxe and 1,643 standard copies;
    Maximum profit = \$17,157.14

24) Sell German wine at \$18.67 per bottle and Italian wine at \$18 per bottle
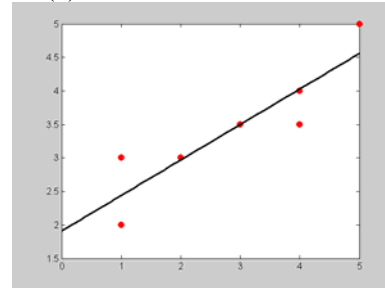
26) 6 in by 6 in by 3 in

30) 6 in by 4 in by 2 in
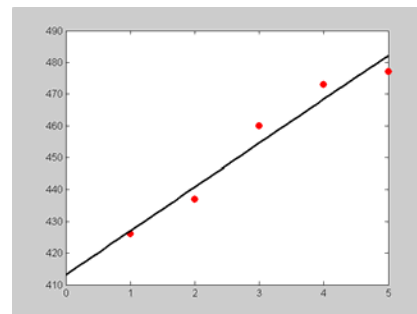
Section 8.4

4) (a) $y = 0.53x + 1.91$

(b)

8) (a) $y = 380x + 901$

(b) 380 stores/year

10) (a) $y = 13.8x + 413.2$

(b)

(c) \$496 million

Section 8.5

2) $F(4,5)=21$ is the min value

4) $f(3,3)=-2$ is the max value

6) $f\left(-\sqrt{2},\dfrac{\sqrt{2}}{2}\right)=f\left(\sqrt{2},-\dfrac{\sqrt{2}}{2}\right)=1$ is the min value

8) $F\left(\dfrac{3}{2},1\right)=\dfrac{3}{2}$ is the rel max.

12) Max of e^4 at $(2,2)$ and $(-2,-2)$

Min of $\dfrac{1}{e^4}$ at $(-2,2)$ and $(2,-2)$

18) 100 deluxe and 300 standard editions

20) Volume $=\dfrac{46,656}{\pi}in^3$

Section 8.6

2) $dz = 4xdx + 6ydy$

4) $dz = (y^3 - 2xy^2)dx + (3xy^2 - 2x^2y)dy$

8) $dz = -\dfrac{2y}{(x-y)^2}dx + \dfrac{2x}{(x-y)^2}dy$

12) $dz = \dfrac{2x}{x^2+y^2}dx + \dfrac{2y}{x^2+y^2}dy$

20) -0.6

28) 0

32) \$32.50/week

34) 65 units