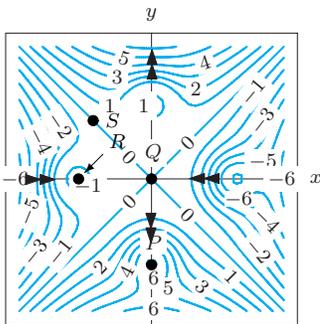
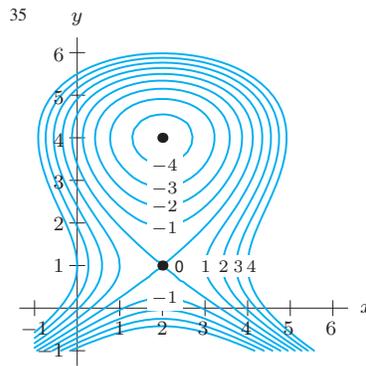
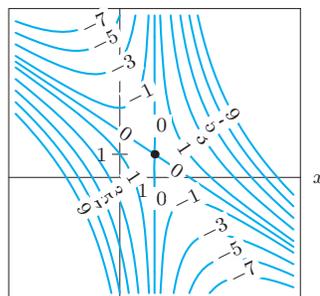


Saddle pts: $(1, 0), (-1, 4)$
 Local min: $(1, 4)$

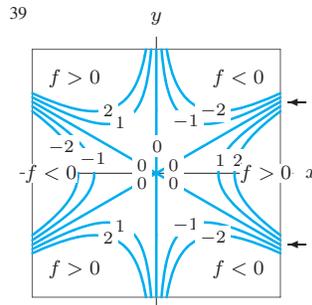
- 19 Saddle point: $(0, 0)$
 Local max: $(1, 1), (-1, -1)$
 21 $A = -2, B = 21$
 23 (a) (a, b)
 (b) $a = -1, b = 5$
 (c) Local maximum
 25 (a) Local maximum
 (b) Saddle point
 (c) Local minimum
 (d) None of these
 27



- 29 $(k\pi, l\pi)$,
 for $k = 0, \pm 1, \pm 2, \dots$,
 $l = 0, \pm 1, \pm 2, \dots$
 $(k\pi + \frac{\pi}{2}, l\pi + \frac{\pi}{2})$,
 for $k = 0, \pm 1, \pm 2, \dots$,
 $l = 0, \pm 1, \pm 2, \dots$
 $(k\pi, l\pi), k = 0, \pm 1, \pm 2, \dots$,
 $l = 0, \pm 1, \pm 2, \dots$ are saddle points
 If k and l are both even or k and l are both odd,
 then $(k\pi + \frac{\pi}{2}, l\pi + \frac{\pi}{2})$ are local max
 If k is even but l is odd or k is odd but l is even,
 then $(k\pi + \frac{\pi}{2}, l\pi + \frac{\pi}{2})$ are local min
 31 $y = 0, \pm 2\pi, \pm 4\pi, \dots$ Local minima
 33 (a) (a, b) is a saddle point.
 (b)



- 35 (a) $(0, 0)$
 (b) $D = -24x^2$
 (c) Saddle point

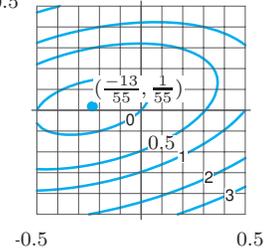


- 39
 41 $(1, 3)$ could be saddle point
 43 Can be saddle if f_{xy} large
 45 $f(x, y) = 4 - (x - 2)^2 - (y + 3)^2$
 47 False
 49 True
 51 False
 53 True
 55 False

Section 15.2

- 1 Mississippi:
 87 - 88 (max), 83 - 87 (min)
 Alabama:
 88 - 89 (max), 83 - 87 (min)
 Pennsylvania:
 89 - 90 (max), 80 (min)
 New York:
 81 - 84 (max), 74 - 76 (min)
 California:
 100 - 101 (max), 65 - 68 (min)
 Arizona:
 102 - 107 (max), 85 - 87 (min)
 Massachusetts:
 81 - 84 (max), 70 (min)
 3 Max: 30.5 at $(0, 0)$
 Min: 20.5 at $(2.5, 5)$
 5 Min = 0 at $(0, 0)$
 (not on boundary)
 Max = 2 at $(1, 1), (1, -1),$
 $(-1, -1)$ and $(-1, 1)$
 (on boundary)
 7 max = 1 at $(1, 0)$ and $(-1, 0)$
 (on boundary)
 min = -1 at $(0, 1), (0, -1)$
 (on boundary)

- 9 Global min
 11 Global max = 0
 No global min
 13 (a) Local min: $(-13/55, 1/55)$
 (b) 0.5



- 15 All edges $(32)^{1/3}$ cm
 17 $l = w = h = 45$ cm
 $(3/14, 1/7, 1/14)$
 23 $q_1 = 300, q_2 = 225$.
 25 (a) $L = \left[pA \left(\frac{a}{k} \right)^a \left(\frac{1}{b} \right)^{a-1} \right]^{1/(1-a-b)}$
 $K = \frac{1}{kb} L$
 (b) No
 27 $y = 24x^2/49 - 2/7$
 31 (a) $p = \sqrt{P_0 P_F}$
 (b) $p_1 = \sqrt[3]{P_0^2 P_F}, p_2 = \sqrt[3]{P_0 P_F^2}$
 33 Must have global maximum if continuous and R closed, bounded
 35 Local max not necessarily global max
 37 $f(x, y) = x^2 + y^2, R$ is $0 \leq x, y \leq 1$
 39 False
 41 False
 43 False
 45 True

Section 15.3

- 1 Min = $-\sqrt{2}$, max = $\sqrt{2}$
 3 Max: 20 at $(-1, 2)$;
 Min: 0 at $(1, -2)$
 5 Min = -22, max = 22
 7 Global min: 1/2
 No global max
 9 Min = $-\sqrt{35}$, max = $\sqrt{35}$
 11 Max: 4 at $(2, 2, 1), (2, -2, -1),$
 $(-2, 2, -1), (-2, -2, 1)$;
 Min: -4 at $(-2, -2, -1), (-2, 2, 1),$
 $(2, -2, 1), (2, 2, -1)$
 13 Max = $f(\frac{1}{\sqrt{5}}, \frac{3}{\sqrt{5}}) = 2\sqrt{5}$
 Min = $f(-\frac{1}{\sqrt{5}}, -\frac{3}{\sqrt{5}}) = -2\sqrt{5}$
 15 No global extrema
 17 Max: $30 + \sqrt{10}$ at $(0, -\sqrt{10})$;
 Min: -5 at $(\pm 3, -1)$
 19 1 at $(1/2, 1/2)$
 21 0.5