

# Solutions to Worksheet 16

① (a) max:  $(\frac{5}{\sqrt{34}}, -\frac{3}{\sqrt{34}})$

min:  $(-\frac{5}{\sqrt{34}}, \frac{3}{\sqrt{34}})$

(b) min:  $(0, 0)$

max:  $(0, \pm 2)$

(c) min:  $(0, 0)$

max:  $(\pm 1, -1)$

(d) max:  $(\pm 4, 0)$

min:  $(\pm \frac{\sqrt{15}}{2}, \pm \frac{7}{2})$

(e) max:  $(\frac{1}{3}, \frac{1}{3}, \frac{1}{3})$

min:  $(0, y, 1-y)$

$(x, 0, 1-x)$

$(x, 1-x, 0)$

(f) max:  $(\frac{\sqrt{2}}{2}, \frac{\sqrt{2}}{2}, \sqrt{2})$

min:  $(-\frac{\sqrt{2}}{2}, -\frac{\sqrt{2}}{2}, -\sqrt{2})$

(g) max:  $(\pm 1, 0, 0)$

min:  $(0, \pm \frac{1}{\sqrt{2}}, 0)$

②  $x=y=z=\sqrt{\frac{32}{3}}$

③  $(0, 0, 0)$

④  $x=18, y=8$