d) after sleeping only 2 hours, your happiness will be decreasing as you exercise 5 hours ($e = 5$).

e) the person with SAD is getting happier as the length of the day increases

(3) a) $\frac{dV}{dt} = 5 \frac{in^3}{min}$

b) $V = \frac{4}{3}\pi r^3$

yes, this relationship always holds

c) $V = \frac{4}{3}\pi r^3$; we want $\frac{dr}{dt}$

$\frac{dV}{dt} = \frac{4}{3}\pi (3r^2)\frac{dr}{dt}$ (differentiate with respect to t)

$\frac{dV}{dt} = 5 \frac{in^3}{min} = 4\pi r^2 \frac{dr}{dt}$

if $r = 4$ in

$$\frac{dr}{dt} = \frac{5 \frac{in^3}{min}}{4\pi (4^2)}$$

if $r = 5$ in

$$\frac{dr}{dt} = \frac{5 \frac{in^3}{min}}{4\pi (5)^2}$$

if $r = r$

$$\frac{dr}{dt} = \frac{5 \frac{in^3}{min}}{4\pi r^2}$$