

AP CALCULUS PROBLEM SET 6 RATES ANSWER KEY

1. a) $\frac{dP}{dt} = \frac{24}{\pi}$ in/sec

b) $\frac{dA}{dt} = \frac{120}{\pi} - 30$ in²/sec

2. a) 15 ft³

b) $\frac{dh}{dt} = -\frac{2}{5}$ ft/min when $h = \frac{3}{2}$ ft

c) $\frac{dA}{dt} = -\frac{4}{3}$ ft²/min when $V = \frac{15}{4}$ ft³

3. a) $\frac{20}{7}$ ft/sec

b) 35 ft from A

c) $\frac{35}{8}$ ft/sec

4. a) $V = \frac{\pi h^3}{27}$ ft³

b) $\frac{dV}{dt} = -9\pi$ ft³/sec

c) $\frac{dy}{dt} = \frac{9}{400}$ ft/sec

5. a) $\frac{\pi}{4} < \theta < 1.373$

b) $P(x, y) = P(\tan \theta, \tan^2 \theta)$

c) $20\sqrt{37} \pi$

6. a) $k = \frac{9}{2}$

b) $k = \frac{3}{2}w$

c) $\left. \frac{dk}{dt} \right|_{w=5} = \frac{21}{2}$

d) $\left. \frac{dA}{dt} \right|_{w=5} = -0.07 \therefore$ area is decreasing