

## Fysiikan matematiikka: Harjoitus 4

1. a)  $\frac{-1}{3}(1 - 2x)^{\frac{3}{2}} + C$   
b)  $\frac{1}{9}(1 + 3x^2)^{\frac{3}{2}} + C$   
c)  $x \ln(x) - x + C$
2. a)  $(\pm 25\sqrt{3} \text{ cm})\hat{\mathbf{i}} + (25 \text{ cm})\hat{\mathbf{j}}$
3. a)  $\mathbf{a} + \mathbf{b} = 4\hat{\mathbf{i}} - \hat{\mathbf{j}} - \hat{\mathbf{k}}, \mathbf{a} - \mathbf{b} = -2\hat{\mathbf{i}} + 3\hat{\mathbf{j}} - \hat{\mathbf{k}}, 2\mathbf{a} - 3\mathbf{b} = -7\hat{\mathbf{i}} + 8\hat{\mathbf{j}} - 2\hat{\mathbf{k}}$   
b)  $|\mathbf{a}| = \sqrt{3}, |\mathbf{b}| = \sqrt{13}$   
c)  $\hat{\mathbf{a}} = \frac{1}{\sqrt{3}}(\hat{\mathbf{i}} + \hat{\mathbf{j}} - \hat{\mathbf{k}}), \hat{\mathbf{b}} = \frac{1}{\sqrt{13}}(3\hat{\mathbf{i}} - 2\hat{\mathbf{j}})$   
d)  $\mathbf{a} \cdot \mathbf{b} = 1$   
e) 1.41 (rad) tai  $80.8^\circ$
4. a)  $24\hat{\mathbf{k}}$       b) 0      c)  $-24\hat{\mathbf{j}}$       d)  $3\hat{\mathbf{i}} + 8\hat{\mathbf{k}}$
5. a)  $\hat{\mathbf{a}} = \pm \frac{1}{3}(-\hat{\mathbf{i}} + 2\hat{\mathbf{j}} + 2\hat{\mathbf{k}})$