

# The Hong Kong Polytechnic University

## Department of Applied Mathematics

### AMA1007 Calculus and Linear Algebra

#### Tutorial 9

#### Application of Integration

1. Find the area of the region enclosed by the given curves.

(a)  $y = \sqrt{x}$ ,  $y = \frac{1}{2}x$ , and  $x = 0$ ,  $x = 9$ ;

(b)  $y = \cos x$ ,  $y = \sin 2x$  and  $x = 0$ ,  $x = \frac{\pi}{2}$ . Check your answer with CoCalc Jupyter.

2. Set up, but do not evaluate, an integral for the volume of the solid obtained by rotating the region bounded by the given curves about the specified line.

(a)  $y = \tan^3 x$ ,  $y = 1$  and  $x = 0$  about  $y = 1$ ;

(b)  $y = \sin x$ ,  $y = 0$  and  $0 \leq x \leq \pi$  about  $y = 1$ ;

(c)  $x^2 - y^2 = 1$ ,  $x = 3$  about  $x = -2$ ;

3. Set up, but do not evaluate, an integral for the length of the curve.

(a)  $y = \cos x$ , for  $0 \leq x \leq 2\pi$ ;

(b)  $x = y + y^3$ , for  $1 \leq y \leq 4$ .

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