Answers to Assignment 00

```
> int(cos(t)^2,t);
```

$$\frac{1}{2}\cos(t)\sin(t)+\frac{1}{2}t$$

```
> int(sin(x)^3,x);simplify(%);
```

$$-\frac{1}{3}\sin(x)^2\cos(x)-\frac{2}{3}\cos(x)$$

$$-\cos(x)+\frac{1}{3}\cos(x)^3$$

```
> int(sqrt(1-cos(t)),t=0..2*Pi);
```

$$4\sqrt{2}$$

```
> int(x*arctan(x),x);
```

$$\frac{1}{2}x^2\arctan(x)-\frac{1}{2}x+\frac{1}{2}\arctan(x)$$

```
> int(1/sqrt(4*x-x^2),x);
```

$$\arcsin(-1+\frac{1}{2}x)$$

```
> int(sqrt(x^2+1),x);
```

$$\frac{1}{2}x\sqrt{x^2+1}+\frac{1}{2}\operatorname{arcsinh}(x)\ \left[\ =\ \frac{1}{2}x\sqrt{x^2+1}+\frac{1}{2}\ln\left|x+\sqrt{x^2+1}\right|\ \right]$$

```
> int(x^3/sqrt(x^2+1),x);
```

$$\frac{1}{3}x^2\sqrt{x^2+1}-\frac{2}{3}\sqrt{x^2+1}\ \left[\ =\ x^2\sqrt{x^2+1}-\frac{2}{3}(x^2+1)^{3/2}\ \right]$$

```
> int(1/(x^2-x-6),x);
```

$$-\frac{1}{5}\ln(x+2)+\frac{1}{5}\ln(x-3)$$

```
> int(sqrt(1+(x-1/(4*x))^2),x=2..4);
```

$$6+\frac{1}{4}\ln(2)$$

```
> plot([x^2-4*x,2*x],x=-2..8);int(2*x-(x^2-4*x),x=0..6);
```

$$36$$

```
> int(Pi*x,x=0..9);int(2*Pi*x^(3/2),x=0..9);
```

$$\frac{81}{2}\pi$$

$$\frac{972}{5}\pi$$

```
> limit((x-arctan(x))/x^3,x=0);
```

$$\frac{1}{3}$$