

```
> f := x - x^2
```

$$f := -x^2 + x$$

(1)

This is a text region. **Assignment 1.** Michael Monagan

What is the derivative of  $\ln(x)$  is  $\frac{1}{x}$

```
> g := ln(x);
```

$$g := \ln(x)$$

(2)

[A comment

```
> h := x*exp(-x);
```

$$h := x e^{-x}$$

(3)

```
> int(f,x)+C;
```

$$\frac{1}{5} x^5 - x + C$$

(4)

```
> diff(g,x);
```

$$\frac{1}{x}$$

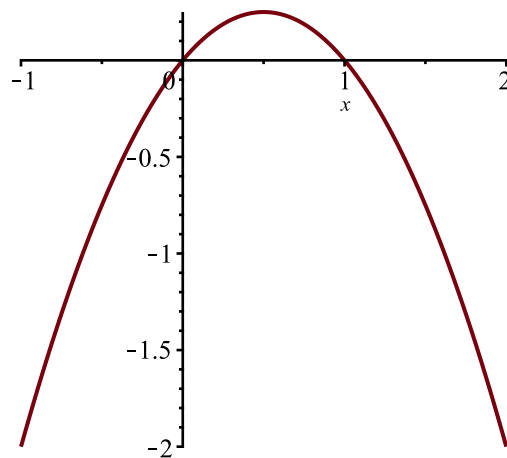
(5)

```
> (h,x);
```

$$-(x+1) e^{-x}$$

(6)

```
> plot(f,x=-1..2);
```



```
> solve(diff(f,x)=0, x);
```

$$\frac{1}{2}$$

(7)

```
> solve(f=0,x);
```

$$0, 1$$

(8)

```
> int(f, x=0..1);
```

$$\frac{1}{6}$$

(9)

```
> f := exp(x)*ln(x)/(1-exp(x));
```

(10)

$$f := \frac{e^x \ln(x)}{1 - e^x} \quad (10)$$

> g := diff(f,x);

$$g := \frac{e^x \ln(x)}{1 - e^x} + \frac{e^x}{x(1 - e^x)} + \frac{(e^x)^2 \ln(x)}{(1 - e^x)^2} \quad (11)$$

> g := simplify(g);

$$g := \frac{e^x (x \ln(x) - e^x + 1)}{(-1 + e^x)^2 x} \quad (12)$$

> h := int(g,x);

$$h := -\frac{\ln(x)}{-1 + e^x} - \ln(x) \quad (13)$$

> simplify(diff(h,x) - g);

$$0 \quad (14)$$

> S := sum(i^2, i=1..n);

$$S := \frac{(n+1)^3}{3} - \frac{(n+1)^2}{2} + \frac{n}{6} + \frac{1}{6} \quad (15)$$

>  $\sum_{i=1}^n (i)$

$$\frac{(n+1)^2}{2} - \frac{n}{2} - \frac{1}{2} \quad (16)$$

> factor(S);

$$\frac{n(n+1)(2n+1)}{6} \quad (17)$$

> eval(S,n=3);

$$14 \quad (18)$$

> binomial(4,3);

$$4 \quad (19)$$

> seq(binomial(4,k), k=0..4);

$$1, 4, 6, 4, 1 \quad (20)$$

> sum(binomial(4,k), k=0..4);

$$16 \quad (21)$$

> sum(k^2\*binomial(n,k), k=0..n);

$$\frac{2^n n}{2} + \frac{2^n n(n-1)}{4} \quad (22)$$

> 30/24;

$$\frac{5}{4} \quad (23)$$

> igcd(30,24);

$$6 \quad (24)$$

> sqrt(8.0);

$$2.8284271250 \quad (25)$$

```

> ln(8.0);
2.0794415420 (26)
=
> f := sin(Pi/3);
f :=  $\frac{\sqrt{3}}{2}$  (27)
=
> evalf(f,20);
0.8660254038 (28)
=
> f := x^4-1;
f :=  $x^4 - 1$  (29)
=
> g := x^3-1;
g :=  $x^3 - 1$  (30)
=
> f+g;
 $x^4 + x^3 - 2$  (31)
=
> 2*f-3*g;
 $2x^4 - 3x^3 + 1$  (32)
=
> expand(f*g);
 $x^7 - x^4 - x^3 + 1$  (33)
=
> simplify(f/g);
 $\frac{(x+1)(x^2+1)}{x^2+x+1}$  (34)
=
> gcd(f,g);
x - 1 (35)
=
> h := x^2-x+1;
h :=  $x^2 - x + 1$  (36)
=
> f/h;
 $\frac{x^4 - 1}{x^2 - x + 1}$  (37)
=
> q := quo(f,h,x);
q :=  $x^2 + x$  (38)
=
> r := rem(f,h,x);
r :=  $-x - 1$  (39)
=
> zero := f - (q*h + r);
zero :=  $-(x^2 - x + 1)(x^2 + x) + x^4 + x$  (40)
=
> expand(zero);
0 (41)
=
> q := quo(f,h,x,'r');
q :=  $x^2 + x$  (42)
=
> r;
-x - 1 (43)
=
> r := rem(f,h,x,'q');
r :=  $-x - 1$  (44)
=
> q;

```

