Multiply complex numbers

$i^2 = -1$

1. $(1+5i)\cdot(-3-i)$

$-3-i-15i-5i^2$

$-3-16i-(-5)$

$-3+5-16i = \underline{2-16i}$

2. $(-1+4i)\cdot(4-3i)$

$-4+3i+16i-12i^2$

$-4+12+3i+16i$

$\underline{8+19i}$

3. $(2-i)(-3+2i)$

$-6+4i+3i-2i^2$

$-6+2+4i+3i$

$-4+7i$

4. $(4+4i)(-2-5i)$

$-8-20i-8i-20i^2$

$-8+20-20i-8i$

$12-28i$

- $(-4+4i)(3+2i)$
  $-12-8i+12i+8i^2$
  $-12-8-8i+12i$
  $-20+4i$
- $(-2-3i)(-5-2i)$
  $+10+4i+15i+6i^2$
  $10-6+4i+15i$
  $4+19i$
- $(1+2i)(1-4i)$
  $1-4i+2i-8i^2$
  $1+8-4i+2i$
  $9-2i$

$(-3-i)(3+i)$
$-9-3i-3i-1^2$
$-9+1-3-3i$
$-8-6i$

Add and Subtract complex nr

1 $(10 - 2i) + (2i)$

10

2 $(-13 + 16i) - (-3 + 4i)$

$-13 + 16i - 3 - 4i$

$-16 + 12i$

3 $(-30i) + (52 - 30i)$

$-30i + 52 - 30i$

$52 - 60i$

4 $(3 + 4i) - (6 - 10i)$

$3 + 4i - 6 + 10i$

$-3 + 14i$

$(18+4i)+(-11+23i)$

$18+4i-11+23i$

$7+27i$

$(7-10i)-(3+30i$

$4-40i$

$(4)+(14-4i)$

$18-4i$

$(-19+7i)-(29+32i)$

$-48-25i$

-42

-11

-83

-40

* $f'(x) = 4f(x)$ $f(0) = 10$

$f'(x) = kf(x)$

$f(x) = C \cdot e^{kx}$

$f(0) = k \cdot e^{4 \cdot 0}$

$10 = k \cdot e^{4 \cdot 0}$

$k = 10$

$f'(x) = 10e^{4x}$

* $\frac{dy}{dt} = y$ $y = 1$ $t = 4$

$\frac{dy}{dt} = ky$

$y = C \cdot e^{kt}$

$k = 1$

$y = C \cdot e^{1 \cdot t}$

$1 = C \cdot e^{4}$

$e^{-4} = C$ $y = e^{t-4}$

differential equations

- $\frac{dy}{dx} = 3y$, $y = 2$, $x = 1$

$$\int \frac{1}{y}\,dy = \int 3\,dx$$

$$\ln|y| = 3x + k$$

$$e^{\ln|y|} = e^{3x+k}$$

$$y = e^{3x} \cdot k \Rightarrow y = ke^{3x} \Rightarrow 2 = ke^{3\cdot 1}$$

$$k = 2e^{-3}$$

$$y = 2e^{-3} \cdot e^{3x}$$

$$y = 2e^{3x-3}$$

- $\frac{dy}{dx} = 3y$, $y = 2$, $x = 1$

$$\int \frac{1}{y}\,dy = \int 3\,dx$$

$$\ln|y| = 3x + k$$

$$e^{\ln|y|} = e^{3x+k}$$

$$y = ke^{3x} \Rightarrow 2 = ke^{3\cdot 1} \Rightarrow 2e^{-3} = k$$

$$y = 2e^{-3} \cdot e^{3x} \Rightarrow y = 2e^{3x-3}$$

• $\frac{dy}{dx} = 7y \quad y=1 \quad x=0$

$\int \frac{1}{y} dy = \int 7 dx$

$e^{\ln|y|} = e^{7x+k}$

$y = ke^{7x} \qquad 1 = ke^{7\cdot 0}$

$k = 1$

$y = 1 \cdot e^{7x} \qquad y = e^{7x}$

• $\frac{dy}{dx} = -4y \quad y=3 \quad x=2$

$\int \frac{1}{y} dy = \int -4 dx$

$e^{\ln|y|} = e^{-4x+k}$

$y = ke^{-4x} \qquad = 3 = ke^{-4\cdot 2} = k = 3e^{8}$

$y = 3e^{8} \cdot e^{-4x} = y = 3e^{8-4x}$

• $\frac{dy}{dt} = 2y \quad y=8 \quad t=0$

$\int \frac{1}{y} dy = \int 2 \cdot dt$

$e^{\ln|y|} = e^{2t+k}$

$y = ke^{2t} \qquad 8 = ke^{2\cdot 0} \quad k = 8$

$y = 8e^{2t}$

- $g'(x) = 8g(x) \quad g(2) = 7$

  $g(x) = ke^{kx} \quad k = 8$

  $7 = ke^{8 \cdot 2} \Rightarrow k = 7e^{-16}$

  $g(x) = 7e^{8x-16}$

- $\frac{dy}{dt} = -7y \quad y = 3 \quad t = 0$

  $\int \frac{1}{y}\,dy = \int -7\,dt$

  $\ln|y| = -7t + k$

  e

  $y = ke^{-7t} \qquad 3 = ke^{-7 \cdot 0} \qquad k = 3$

  $y = 3e^{-7t}$

- $h'(x) = 6h(x) \quad h(1) = 5$

  $h(x) = ke^{kx} \quad k = 6$

  $5 = ke^{6 \cdot 1} \Rightarrow k = 5e^{-6}$

  $h(x) = 5e^{6x-6}$

- $h'(x) = -h(x) \quad h(0) = 12$

  $h(x) = ke^{kx} \quad k = -1$

  $12 = ke^{-1 \cdot 0} \quad k = 12$

  $h(x) = 12e^{-1x}$

- $f'(x) = -6f(x) \quad f(2) = 1$

  $f(x) = ke^{kx} \quad k = -6.$

  $1 = ke^{-6 \cdot 2} \quad k = e^{12}$

  $h(x) = e^{12-6x}$