Worksheet 001 (1~5)

In [1]:
```
from sympy import *
from sympy.plotting import plot, plot3d
import matplotlib.pyplot as plt
%matplotlib inline

plt.rcParams['figure.figsize'] = 10, 10
init_printing(use_unicode=True)
x, y, a, b = symbols('x y a b')
```

1. If $a(x+2)+b(x-1)=3$ for all x, then $a=$

   (A) -1 (B) 0 (C) 1 (D) 2 (E) 3

Solution

My work

$$a(x+2)+b(x-1)=3$$
$$ax+2a+bx-b=3$$
$$(a+b)x+(2a-b)=3$$

$$\swarrow \quad \searrow$$

$$a+b=0 \text{ or } 2a-b=3$$

$$+\begin{cases} a+b &= 0 \\ 2a-b &= 3 \end{cases}$$
$$3a = 3$$

$a=\frac{3}{3}=1$

$b=-a=-1$

$$\begin{cases} a=1 \\ b=-1 \end{cases}$$

Using SymPy

Method 1

In [2]:
```
eq = Eq((a*(x+2))+b*(x-1), 3)
eq
```

Out[2]: $a\,(x+2)+b\,(x-1)=3$

In [3]:
```
solve(eq, a, b)
```

Out[3]: $\{a:1,\quad b:-1\}$

Method 2

In [4]:
```
solve(((a*(x+2))+b*(x-1)-3), a, b)
```

Out[4]: $\{a:1,\quad b:-1\}$

Answer: (C)

2. If $a+b=2$ and $ab=-1$, then $a^2+b^2=$

   (A) 4 (B) 5 (C) 6 (D) 8 (E) 10

Solution

My Work

$$\begin{aligned} a^2+b^2 &= a^2+b^2+2ab-2ab \\ &= (a+b)^2-2ab \\ &= 2^2-2(-1) \\ &= 6 \end{aligned}$$

Using SymPy

In [5]:
```
expr = (a+b)*(a+b)-2*a*b
expr.subs([(a+b, 2), (a*b, -1)])
```

Out[5]: 6

In [ ]:
```

```