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```
syms q1 q2 q3 px py pz
```

```
L1 = 12
```

```
L2 = L1
```

```
EqX = px == L1*cos(q1) + L2*cos(q1+q2)
```

```
EqY = py == L1*sin(q1) + L2*sin(q1+q2)
```

```
EqZ = pz == L1 - q3
```

```
[Sol_q1 Sol_q2 Sol_q3] = solve([EqX EqY EqZ], [q1 q2 q3]);
```

```
Sol_q1 = simplify(Sol_q1)
```

```
Sol_q2 = simplify(Sol_q2)
```

```
Sol_q3 = simplify(Sol_q3)
```

```
L1 =
```

```
12
```

```
L2 =
```

```
12
```

```
EqX =
```

```
px == 12*cos(q1 + q2) + 12*cos(q1)
```

```
EqY =
```

```
py == 12*sin(q1 + q2) + 12*sin(q1)
```

```
EqZ =
```

```
pz == 12 - q3
```

```
Sol_q1 =
```

```
2*atan((24*py + (- px^4 - 2*px^2*py^2 + 576*px^2 - py^4 + 576*py^2)^(1/2))/  
(px^2 + 24*px + py^2))
```

```
2*atan((24*py - (- px^4 - 2*px^2*py^2 + 576*px^2 - py^4 + 576*py^2)^(1/2))/  
(px^2 + 24*px + py^2))
```

```
Sol_q2 =
```

```
-2*atan((- (px^2 + py^2)*(px^2 + py^2 - 576))^(1/2)/(px^2 + py^2))
```

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$$2*\text{atan}((-(px^2 + py^2)*(px^2 + py^2 - 576))^{1/2}/(px^2 + py^2))$$

$Sol\_q3 =$

$12 - pz$

$12 - pz$

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