In [106]:

```
import matplotlib.pyplot as plot
```

Step index optical fiber

In [107]:

```
radius = 50 # radius of core
n1 = 1.5 # core
n2 = 1.2 # cladding
```

In [108]:

```
distance = [x for x in range(-100, 100)]
```

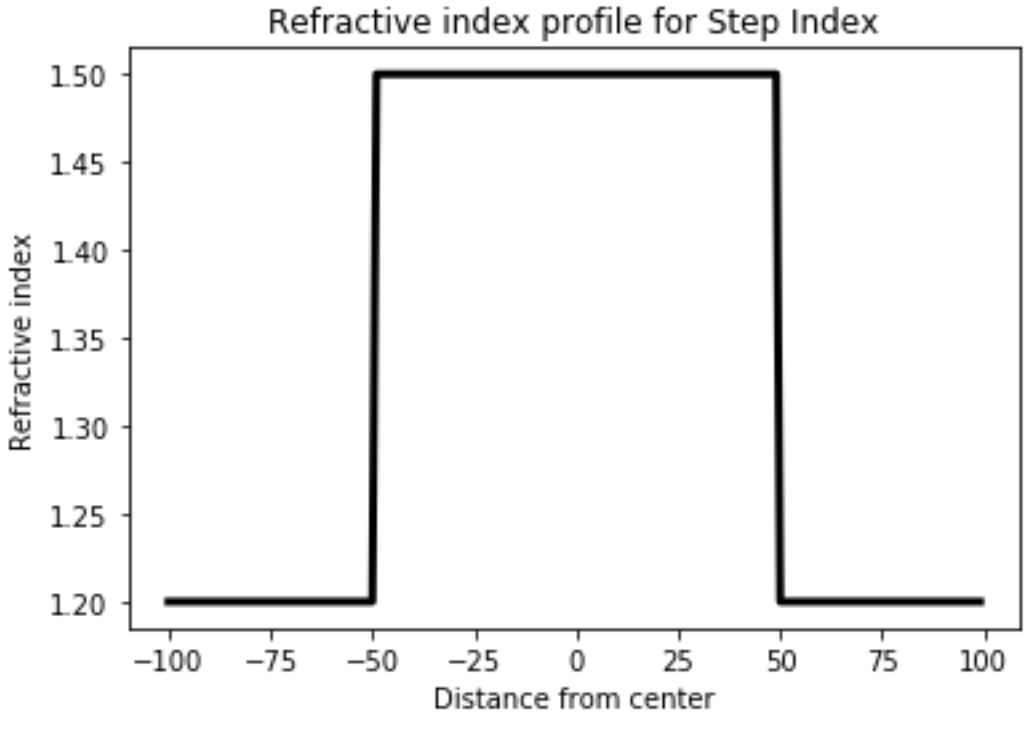
In [109]:

```
def calculate_y(distance):
    y = list()
    for x in distance:
        if x > -50 and x < 50:
            y.append(n1)
        else:
            y.append(n2)

    return y
```

In [120]:

```
y = calculate_y(distance)
mlt.plot(distance, y, 'k', linewidth=3)
mlt.xlabel('Distance from center')
mlt.ylabel('Refractive index')
mlt.title('Refractive index profile for Step Index')
mlt.show()
```



Graded Index Fiber optical fiber

In [132]:

```
n1 = 1.5 # core
n2 = 1.1 # cladding
radius = 50 # radius of core
a = 1 # alpha for triangular profile
relative_index = (n1-n2)*2/(n1+n2)
```

In [133]:

```
distance = [x for x in range(-100, 100)]
```

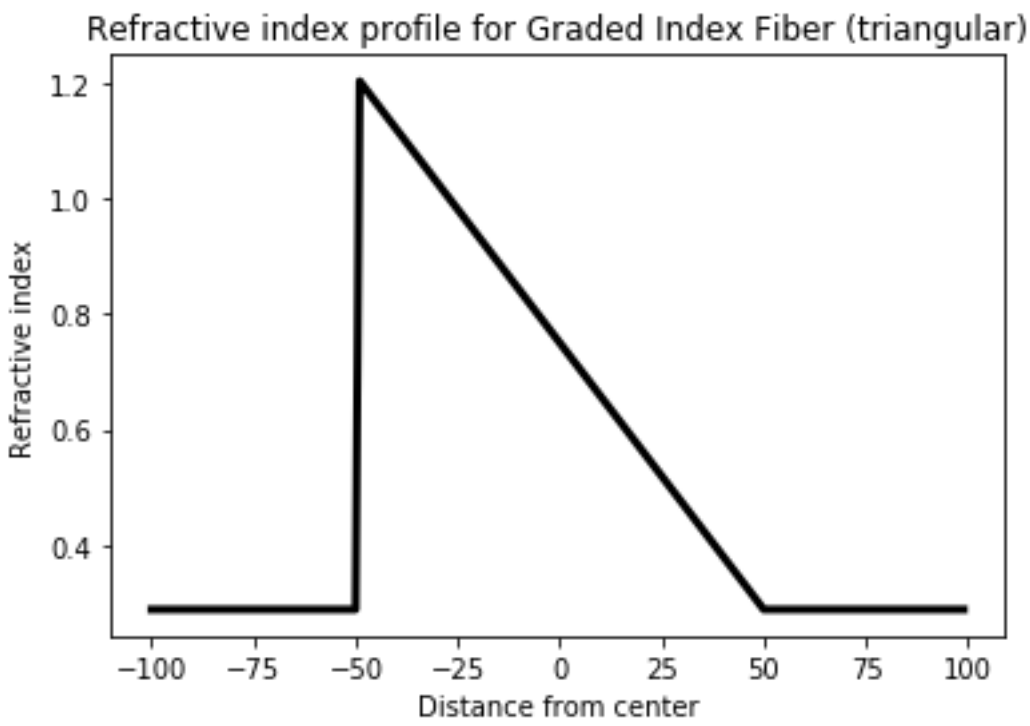
In [134]:

```
def calculate_y(distance):
    y = list()
    for x in distance:
        if x > -radius and x < radius:
            y.append(n1*((1-2*relative_index*((x/radius)**a))**1/2))
        else:
            y.append(n1*((1-2*relative_index)**1/2))

    return y
```

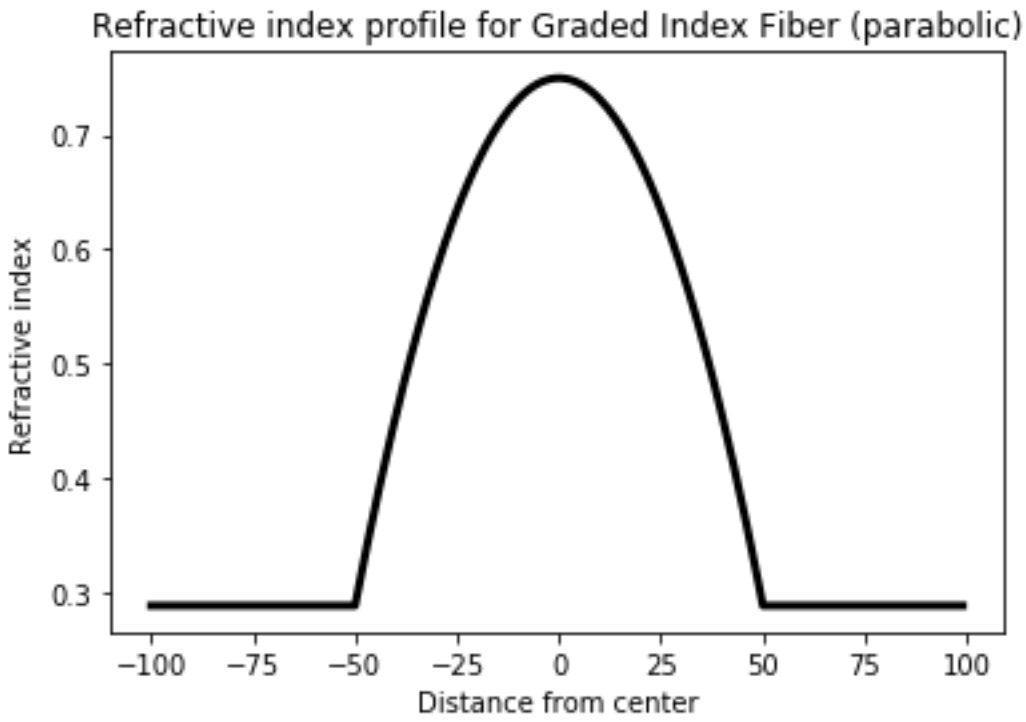
In [135]:

```
y = calculate_y(distance)
mlt.plot(distance, y, 'k', linewidth=3)
mlt.xlabel('Distance from center')
mlt.ylabel('Refractive index')
mlt.title('Refractive index profile for Graded Index Fiber (triangular)')
mlt.show()
```



In [136]:

```
a = 2 # alpha for parabolic profile
y = calculate_y(distance)
mlt.plot(distance, y,'k', linewidth=3)
mlt.xlabel('Distance from center')
mlt.ylabel('Refractive index')
mlt.title('Refractive index profile for Graded Index Fiber (parabolic)')
mlt.show()
```



In [ ]:

```

```