Use linear approximation to estimate:

$$(16.01)^{3/2} + 2\cdot\sqrt{16.01}$$

$$L(x) = f(a) + f'(a)(x-a)$$

$a \to$ known, easy to compute #, close to 16.01 (16)

$$f(x) = x^{3/2} + 2\cdot\sqrt{x} \to f'(x) = \frac{3}{2}\cdot x^{1/2} + 2\cdot\frac{1}{2}\cdot x^{-1/2}$$

$$L(x) = L(16.01)$$

$$f(a) = f(16) = 16^{3/2} + 2\sqrt{16}$$

$$= (4^2)^{3/2} + 2\cdot\sqrt{16}$$

Recall: $(x^m)^n = x^{m\cdot n}$

$$= (4^{\cancel{2}\cdot\frac{3}{\cancel{2}}}) + 2\cdot 4$$

$$= 64 + 8 = 72$$

$$f'(x) = \frac{3}{2}\cdot x^{1/2} + \cancel{2}\cdot\frac{1}{\cancel{2}}\cdot x^{-1/2}$$

$$f'(16) = \frac{3}{2}\cdot(16)^{1/2} + (16)^{-1/2}$$

$$= \frac{3}{2}\cdot 4 + \frac{1}{\sqrt{16}} = \frac{6}{1}_{(4)} + \frac{1}{4} = \frac{25}{4}$$

$$L(x) = f(a) + f'(a)(x-a)$$

$$\underbrace{L(x) = 72 + \frac{25}{4}(x-16)}$$

$$L(16.01) = 72 + \frac{25}{4}(\underbrace{16.01 - 16}_{0.01})$$

$$= 72 + \frac{\cancel{25}^{1}}{4}\cdot\frac{1}{\cancel{100}_{4}} = 72 + \frac{1}{16} = 72\frac{1}{16}$$