

Name : _____

Score : _____

Teacher : _____

Date : _____

Linear Approximations

Use linear approximation to find estimates of each value.

1) $6^{3.99}$

2) $2^{3.01}$

3) 4.98^2

4) 7.02^2

5) $3^{2.99}$

6) 3.97^3

7) $7^{1.97}$

8) $\cos(57^\circ)$

9) $\cos(61^\circ)$

10) $\cos(33^\circ)$



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Linear Approximations

Use linear approximation to find estimates of each value.

1) $6^{3.99}$

Use $f(x) = 6^x$, $x_0 = 4$, and $\Delta x = \frac{-1}{100}$

$$6^{3.99} \approx 1296 - \frac{324}{25} \ln(6)$$

2) $2^{3.01}$

Use $f(x) = 2^x$, $x_0 = 3$, and $\Delta x = \frac{1}{100}$

$$2^{3.01} \approx 8 + \frac{2}{25} \ln(2)$$

3) 4.98^2

Use $f(x) = x^2$, $x_0 = 5$, and $\Delta x = \frac{-2}{100}$

$$4.98^2 \approx \frac{124}{5}$$

4) 7.02^2

Use $f(x) = x^2$, $x_0 = 7$, and $\Delta x = \frac{2}{100}$

$$7.02^2 \approx \frac{1232}{25}$$

5) $3^{2.99}$

Use $f(x) = 3^x$, $x_0 = 3$, and $\Delta x = \frac{-1}{100}$

$$3^{2.99} \approx 27 - \frac{27}{100} \ln(3)$$

6) 3.97^3

Use $f(x) = x^3$, $x_0 = 4$, and $\Delta x = \frac{-3}{100}$

$$3.97^3 \approx \frac{1564}{25}$$

7) $7^{1.97}$

Use $f(x) = 7^x$, $x_0 = 2$, and $\Delta x = \frac{-3}{100}$

$$7^{1.97} \approx 49 - \frac{147}{100} \ln(7)$$

8) $\cos(57^\circ)$

Use $f(x) = \cos(x)$, $x_0 = \frac{\pi}{3}$, and $\Delta x = \frac{-\pi}{60}$

$$\cos(57^\circ) \approx \frac{1}{2} + \frac{\sqrt{3}\pi}{120}$$

9) $\cos(61^\circ)$

Use $f(x) = \cos(x)$, $x_0 = \frac{\pi}{3}$, and $\Delta x = \frac{\pi}{180}$

$$\cos(61^\circ) \approx \frac{1}{2} - \frac{\sqrt{3}\pi}{360}$$

10) $\cos(33^\circ)$

Use $f(x) = \cos(x)$, $x_0 = \frac{\pi}{6}$, and $\Delta x = \frac{\pi}{60}$

$$\cos(33^\circ) \approx \frac{\sqrt{3}}{2} - \frac{\pi}{120}$$

