Calculus 1 Workbook

Linear approximation

krista king
MATH

LINEAR APPROXIMATION

■ 1. Find the linear approximation of $f(x) = x^3 - 4x^2 + 2x - 3$ at $x = 3$ and use it to approximate $f(3.02)$.

■ 2. Find the linear approximation of $g(x) = \sqrt{8x - 15}$ at $x = 8$ and use it to approximate $f(8.05)$.

■ 3. Find the linear approximation of $h(x) = 2e^{x-4} + 6$ at $x = 5$ and use it to approximate $h(5.1)$.

■ 4. Find the linear approximation of $f(x) = \ln(2x - 7)$ at $x = 4$ and use it to approximate $f(3.8)$.

■ 5. Use linear approximation to estimate $f(3.1)$.

$$f(x) = \sin(3x)$$

■ 6. Use linear approximation to estimate $f(6.1)$.

$$f(x) = e^{\cos x}$$

ESTIMATING A ROOT

- 1. Use linear approximation to estimate $\sqrt[5]{34}$.
- 2. Use linear approximation to estimate $\sqrt[8]{260}$.
- 3. Use linear approximation to estimate $\sqrt[4]{85}$.
- 4. Use linear approximation to estimate $\sqrt[4]{615}$.
- 5. Use linear approximation to estimate $\sqrt{95}$.
- 6. Use linear approximation to estimate $\sqrt[3]{700}$.

ABSOLUTE, RELATIVE, AND PERCENTAGE ERROR

■ 1. Use a linear approximation to estimate the value of $e^{0.002}$, then find the absolute error of the estimate.

■ 2. Use linear approximation to estimate $f(2.15)$, then find the relative error of the estimate.

$$f(x) = 4xe^{3x-6}$$

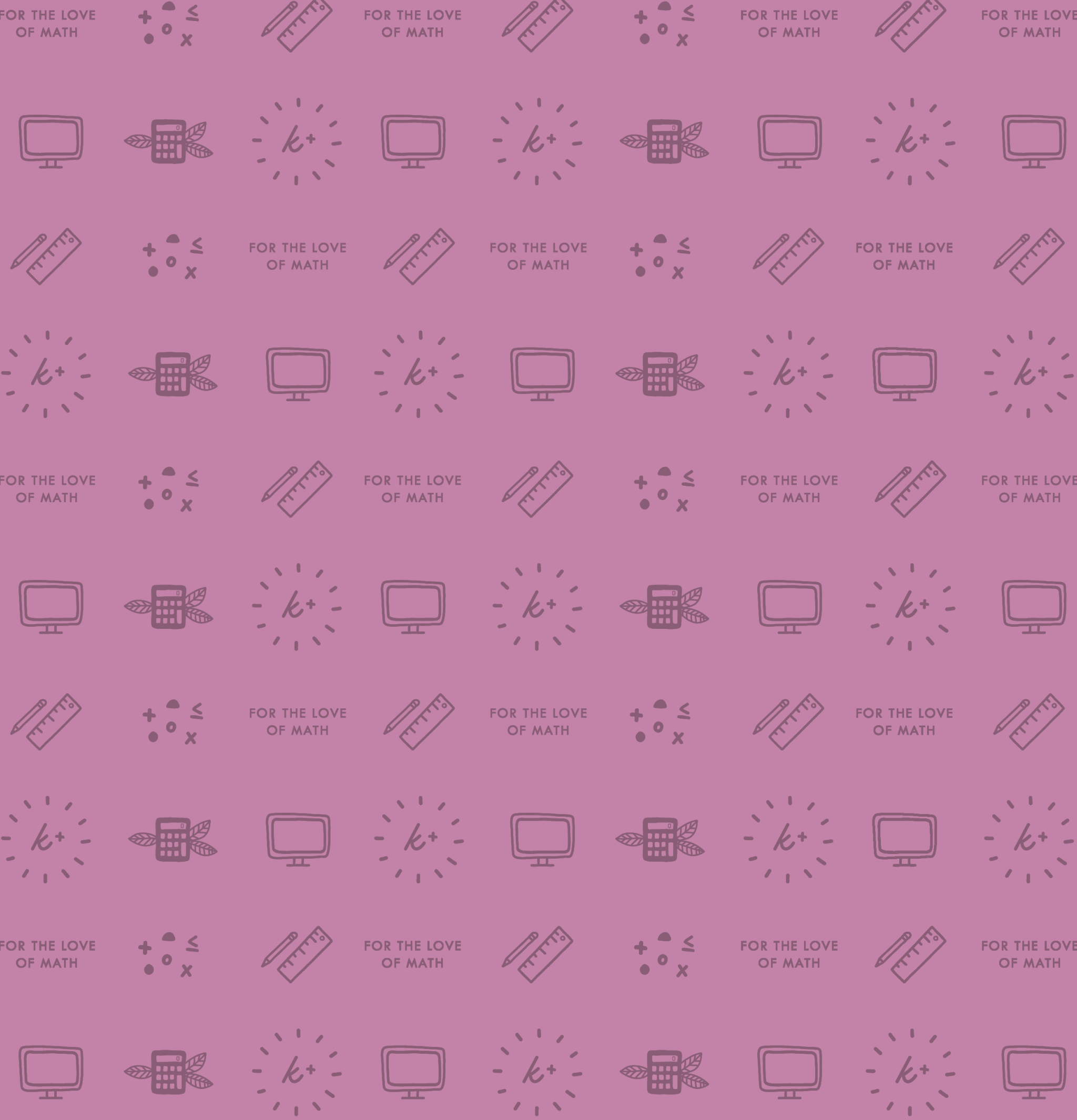
■ 3. Use linear approximation to estimate $f(1.2)$, then find the percentage error of the estimate.

$$f(x) = \sqrt[3]{x+1}$$

■ 4. Use a linear approximation to estimate the value of $\sqrt[3]{30}$, then find the relative error of the estimate.

■ 5. Find the absolute, relative, and percentage error of the approximation 2.7 to the value of e.

6. Use a linear approximation to estimate the value of $\sin(93^\circ)$, then find the absolute error of the estimate.



WWW.KRISTAKINGMATH.COM