Differentials

1. Use differentials to find and approximate value for the given quantity.

$$\left(\sqrt[3]{30}\right)\left(\sqrt[4]{12}\right)$$

2. Use differentials to approximate $\sqrt{402}$

A) 20.049 B) 20.05 C) 20.051 D. 20.1

3. Use differentials to find an appropriate value of $\log_{10} 1.015$.

A) $1+(0.15)(\log_{10} e)$ B) $(0.15)(\log_{10} e)$ C) $(1+.015)(\log_{10} e)$ D) $\dfrac{1}{(\log_{10} e)(1+0.15)}$

4. The approximate value of $\sqrt[3]{124}$, using differentials, is

A) $4+\dfrac{124}{125}$ B) $4+\dfrac{99}{100}$ C) $4+\dfrac{74}{75}$ D) $4+\dfrac{61}{62}$

5. If differentials are used for the evaluation, then $\sqrt[4]{15}$ is approximately equal to

A) 2.97 B) 1.97 C) 2.03 D) 1.99 E) 1.94

6. The reasonable two-place approximation for $\sqrt[4]{84}$ found by the use of differentials is :

A) 2.98 B) 3.01 C) 3.03 D) 3.05

7. Use differentials to approximate the change in y as x changes from 3 to 3.1 in $y = x^2 + 6x + 9$.

A) .1 B) 1.2 C) 12.79 D) 19.21

8. Use differentials to find an approximate value for $\sqrt{23} - \sqrt[3]{9}$.

A) $3\dfrac{7}{60}$ B) $3\dfrac{1}{60}$ C) $2\dfrac{53}{60}$ D) $2\dfrac{43}{60}$

9. Approximate the value of $6x^4 - 4x^3 + 5x^2 - 6$ when x=.97 using differentials.

A) .34 B) .36 C) 1.34 D) 1.36

10. Using differentials, approximate $\sqrt[5]{240}$ as a rational number.

A) $2\dfrac{99}{100}$ B) $2\dfrac{134}{135}$ C) $2\dfrac{404}{405}$ D) $3\dfrac{1}{135}$

Answers for Differentials

$\frac{35}{6}$ 1. (Plant City Team #11 and DCPS 1988 #2 and Nationals 1986 #5!) $\frac{35}{6} = 5.8\overline{3}$

B 2. (Sunset 1991 Ind #19) B

B 3. (DCPS 1988 #15) B $0.015 \log_{10} e$

C 4. (Regional Feb 89 #12) C $4 \cdot \frac{71}{75}$

B 5. (DCPS March 1990 #56) B

C 6. (Nationals 1989 #27) C

B 7 (Coral Springs #7 '90) B

D 8. (Plant City #2 '90) D

A 9. (Stoneman Douglas '91 # 18) A

B 10 (Regional feb 9, 91 #12) B