

Find All Real solution(s):

1. $4x^5 = 128$

a. $x^5 = 32$

Divide both sides by 4

b. $x = \sqrt[5]{32}$

Take the 5th root of each side

c. $\boxed{x = 2}$

Simplify

2. $(x - 3)^4 = 21$

a. $x - 3 = \pm \sqrt[4]{21}$

Take the 4th root of each side

b. $x = 3 \pm \sqrt[4]{21}$

Add 3 to each side

c. $\boxed{x = 5.141 \text{ or } 0.859}$

Use a calculator

A hospital purchases an ultrasound machine for \$50,000. The hospital expects the useful life of the machine to be 10 years, at which time its value will have depreciated to \$8000. The hospital uses the **declining balances method for depreciation**, so the annual depreciation rate r (in decimal form) is given by the formula

$$r = 1 - \left(\frac{S}{C}\right)^{1/n}$$

In the formula, n is the useful life of the item (in years), S is the salvage value (in dollars), and C is the original cost (in dollars). What annual depreciation rate did the hospital use?

Solution:

The useful life is 10 years, so $n = 10$. The machine depreciates to \$8000, so $S = 8000$. The original cost is \$50,000, so $C = 50,000$. Therefore the annual depreciation rate is:

$$r = 1 - \left(\frac{S}{C}\right)^{1/n} = 1 - \left(\frac{8000}{50,000}\right)^{1/10} = 1 - \left(\frac{4}{25}\right)^{1/10} \approx 0.16745 = \boxed{16.745\%}$$

In 1951 a certain grocery item A cost $P_1 = \$2.29$, and in 1989 the cost was $P_2 = \$5.15$. Find the annual rate of

inflation using the formula $r = \left(\frac{P_2}{P_1}\right)^{1/n} - 1$ where n = the time in years.

Solution:

$$r = \left(\frac{P_2}{P_1}\right)^{1/n} - 1 = \left(\frac{5.15}{2.29}\right)^{1/38} - 1 \approx 0.02156 = \boxed{2.156\%}$$

Find All Real solution(s):

1. $x^3 = 125$

2. $5x^3 = 1080$

3. $(x + 10)^5 = 70$

4. $(x - 5)^4 = 256$

5. $x^5 = -48$

6. $7x^4 = 56$

7. $x^6 + 36 = 100$

8. $x^3 + 40 = 25$

9. $\frac{1}{3}x^4 = 27$

10. $\frac{1}{6}x^3 = -36$

11. When the price of an item increases from p_1 to p_2 over a period of n years, the annual rate of inflation r (in decimal form) is given by $r = \left(\frac{P_2}{P_1}\right)^{1/n} - 1$. Find the rate of inflation for each item in the table.

Item	Price in 1913	Price in 2013
Potatoes (lb)	\$0.016	\$0.627
Ham (lb)	\$0.251	\$2.693
Eggs (dozen)	\$0.373	\$1.933

a. Potatoes

b. Ham

c. Eggs