Real world radical formulas

Science, Mathematics

Mathemetics: Real World Radical Formulas al affiliations. a) The formula below shows sailboat stability. C= 4d 3b The variables b and d describe the sailboat, Tartan 4100, breadth in feet and displacement in pounds respectively. C represents the capsize screening value. This value should be less than 2 in order for the ship not to capsize. Substituting 23, 245 for d and 13. 5 for b,

C = 4(23, 245)-1/3*13. 5

= 4*1/(23, 245)1/3*13. 5

= 4*1/3√(23, 245)*13. 5

= 4*1/28. 54*13. 5

= 1. 89

b) C= 4d-1/3b

When solving the formula above for d, we are making d the subject of the formula. We proceed as follows. Divide both sides of the equation by 4b

C/4b = d-1/3

we know from the rules of indices that n-1 = 1/n. Thus, our formula above becomes,

C/4b = 1/d1/3

We can replace the index notation witha radical notation as follows.

C/4b = 1/3√d

Taking the reciprocal of both sides we get,

4b/C = 3√d

Taking the third root of both sides we obtain

3√(4b/C) = d

Rearranging,

d = 3√(4b/C)

c) C= 4d-1/3b

b = 13. 5

In order for the Tartan 4100 not to sink, the Capsize screening value (C) must be less than 2. We shall use the value of C obtained earlier in solution (a) above which is 1. 89. substituting C with 1. 89,

1. 89= 4d-1/313. 5

Dividing both sides by 4, we obtain,

1. 89/4 = d-1/3*13. 5

0. 4725 = d-1/3*13. 5

Dividing both sides by 13. 5, we obtain,

0. 4725/13. 5 = d-1/3

0. 035 = d-1/3

Again from then rules of indices, we replace the index notation with the radical notation.

0. 035 = d-1/3

0. 035 = 1/3√d.

This implies that,

1/0. 035 = 3√d.

d = 3√28. 5714

d = 3. 0571pounds.

The use of this equation is very vital for ship builders in the sense that the formula must be applied to know how much weight the ship must hold at any given time in order not to capsize. The builders will thus be able to determine how much load the ship will carry and how much will cause the

ship to capsize when loaded.

Reference

Anton, H. (1994). Elementary linear algebra (7th ed.). New York: John Wiley.