

Factorizing Cubic Equations Of The Form  
 $Ax^3 + Bx^2 + Cx + D = 0$

Written by Adi Cox 4th May 2013

---

Where  $a, b, c$  are the integer solutions to the cubic equation if and only if  $A = 1$ .

$B = a+b+c$   
 $C = ab+ac+bc$   
 $D = abc$

The html file below finds the value of  $C$  in the cubic equation for the values  $B$  and  $D$  that are entered.

---

```
<!DOCTYPE HTML PUBLIC " - //W3C//DTD XHTML 1.0 Transitional//EN"
"http://www.w3.org/TR/xhtml1/DTD/xhtml1-transitional.dtd"
">
<html xmlns="http://www.w3.org/1999/xhtml">
<head>
<title>A for loop</title>
</head>
<body>
<script type="text/javascript" language="javascript">

document.write("<h3>a, b, c, = a*b + a*c + b*c<h3>")

B=28;
D=-160;

u=-300;
v=300;

for (a = u; a <= v; a++)
{
    for (b = u; b <= v; b++)
    {
        for (c = u; c <= v; c++)
        {
            if ((a+b+c==B) && (a*b*c==D))
            {

document.write(a, ", ", b, ", ", c, ", ",
    " = ", a*b + a*c + b*c, "<br />");
            }
        }
    }
}

</script>
</body>
</html>
```

---

The above html file gives the value of C in the cubic equation where B=28 and D=-160

This is the output below:

---

$$a, b, c, = a*b + a*c + b*c$$

$$-5, 1, 32, = -133$$

$$-5, 32, 1, = -133$$

$$1, -5, 32, = -133$$

$$1, 32, -5, = -133$$

$$32, -5, 1, = -133$$

$$32, 1, -5, = -133$$

---

The above answer is divided by the value of A in the cubic equation to get the three solutions.

If A=2

then the solutions would be  $1/2$ ,  $-5/2$  and  $32/2$