**Project Description**

1) For each problem on page 2, find the roots using factoring, completing the square or the quadratic formula.

2) For each problem on page 2, find the sum of the roots and also their product.

3) How can we obtain the sum of the roots and the product of roots by simply applying arithmetic operations on the values of a, b or c?

4) Prove your conjecture in #2 by using the quadratic formula which gives us the roots of .

Extra credit: Textbooks always mention the product and sum of quadratic roots. But the difference and quotient of the quadratic roots are rarely mentioned. Why do you think that is the case? [+2]

**Project Rubric**

1) For each problem on page 2, find the roots using factoring, completing the square or the quadratic formula.

[+1] for finding the correct roots for **each** problem

2) For each problem on page 2, find the sum of the roots and also their product.

[+1] for finding the correct sum of the roots of **all** problems

[+1] for finding the correct product of the roots of **all** problems

3) How can we obtain the sum of the roots and the product of roots by simply applying arithmetic operations on the values of a, b or c?

[+1] for making the correct conjecture on getting the sum of roots

[+1] for making the correct conjecture on getting the product of roots

4) Prove your conjecture in #2 by using the quadratic formula which gives us the roots of .

[+1] for correctly justifying the sum of the roots

[+2] for correctly justifying the product of the roots

|  |  |
| --- | --- |
| a)  | b)  |
| c)  | d)  |
| e)  | f)  |
| g)  | h)  |

Solutions

|  |  |
| --- | --- |
| a) The roots are: x = -1, -3Product: 3Sum: -4 | b) The roots are: x = -5, 2Product:-10Sum:-3 |
| c) The roots are: x = -2, 3Product: -6Sum: 1 | d) The roots are: x = 3, 4Product: 12Sum: 7 |
| e) The roots are: x = -1, - 7/3Product: 7/3Sum: -10/3 | f) The roots are: x = 3, 3/2Product: 9/2Sum: 9/2 |
| g) The roots are: Product: 6Sum: 6 | h) The roots are: Product: -4Sum: -2 |

2) and 3) The quadratic roots are: 



Extra credit:



The difference and quotient of the quadratic roots are not as elegant as the sum and product of the roots. It’s rather cumbersome, like the quadratic formula. In addition, there might be two solutions when it comes to difference since it can also be expressed as 