

Advanced Algebra

Unit 4: Quadratics

Assignment #7 Using The Discriminant (Page 162 IB SL Book)

Notes:

$b^2-4ac=0$ 1 Real Root	If b^2-4ac is a perfect square, then the problem FACTORS
$b^2-4ac>0$ 2 Real Roots	
$b^2-4ac<0$ No Real Roots	

1) By using the discriminant only, state the number of solutions of:

a) $x^2+7x-3=0$

$49 - 4(1)(-3) = 61$
2 Real Roots

b) $3x^2+2x-1=0$

$4 - 4(3)(-1) = 16$
2 Real Roots

c) $5x^2+4x-3=0$

$16 - 4(5)(-3) = 76$
2 Real Roots

d) $x^2+x+5=0$

$1 - 4(1)(5) = -19$
No solution

e) $16x^2-8x+1=0$

$64 - 4(16)(1) = 0$
1 Real Root

2) By using the discriminant, determine which of the following quadratic equations have rational roots which can be found by factorization.

a) $6x^2-5x-6=0$

$25 - 4(6)(-6) = 169$
2 Roots Factors ✓

b) $2x^2-7x-5=0$

$49 - 4(2)(-5) = 89$
2 Roots can't factor

c) $3x^2+4x+1=0$

$16 - 4(3)(1) = 4$
2 Roots Factors

d) $6x^2-47x-8=0$

$2209 - 4(6)(-8) = 2401$
2 Roots Factors

e) $4x^2-3x+2=0$

$9 - 4(4)(2) = -23$
NO Real Roots

f) $8x^2+2x-3=0$

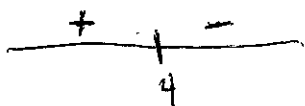
$4 - 4(8)(-3) = 100$
2 Roots Factors

3) For the following quadratic equations, determine the discriminant and draw a sign diagram for it. Hence, find the value of m for which the equation has:

i) a repeated root

a) $x^2+4x+m=0$

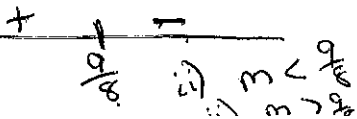
$16 - 4(1)(m) = 0$ (i) $x < 4$
 $16 - 4m = 0$ (ii) $x > 4$
 $m = 4$



ii) two distinct real roots

b) $mx^2+3x+2=0$

$9 - 4(m)(2) = 0$
 $9 - 8m = 0$
 $m = \frac{9}{8}$



iii) no real roots

c) $mx^2-3x+1=0$

$9 - 4m(1) = 0$
 $9 - 4m = 0$
 $m = \frac{9}{4}$

