

Homework

I. Solve the following using any method (Factoring, Completing the Square, or The Quadratic Equation)

1) $x^2 + 8x + 15 = 0$

$(x+5)(x+3) = 0$

$x+5=0$ -5 -5 $x = -5$	$x+3=0$ -3 -3 $x = -3$
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$\{-5, -3\}$

$x^2 + 8x + 15 = 0$
 $x^2 + 8x = -15$
 $x^2 + 8x + (\frac{8}{2})^2 = -15 + (\frac{8}{2})^2$
 $x^2 + 8x + 16 = -15 + 16$
 $(x+4)^2 = 1$
 $x+4 = \pm 1$

$x+4=1$
-4 -4
 $x = -3$

$x+4=-1$
-4 -4
 $x = -5$

2) $3x^2 + 16x - 84 = 0$

$a=3$ $x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$
 $b=16$
 $c=-84$ $x = \frac{-16 \pm \sqrt{(16)^2 - 4(3)(-84)}}{2(3)}$

$x = \frac{-16 \pm \sqrt{256 + 1008}}{6}$
 $x = \frac{-16 \pm \sqrt{1264}}{6}$
 $x = \frac{-16 \pm 4\sqrt{79}}{6}$
 $x = \frac{-8 \pm 2\sqrt{79}}{3}$

3) $x^2 + 6x + 9 = 0$

$(x+3)(x+3) = 0$

$x+3=0$ -3 -3 $x = -3$	$x+3=0$ -3 -3 $x = -3$
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$\{-3\}$

$x^2 + 6x + 9 = 0$
 $x^2 + 6x = -9$
 $x^2 + 6x + (\frac{6}{2})^2 = -9 + (\frac{6}{2})^2$
 $x^2 + 6x + 9 = -9 + 9$
 $(x+3)^2 = 0$
 $x+3=0$
 $-3 -3$
 $x = -3$

II. Find the number of real solutions using the discriminant

1) $3x^2 = 5x - 1$

$3x^2 - 5x + 1 = 0$

$a=3$ $b^2 - 4ac$
 $b=-5$ $(-5)^2 - 4(3)(1)$
 $c=1$ $25 - 4(3)(1)$
 $25 - 12$
 13 \rightarrow NOT a perfect square

2 real irrational solutions (roots)

2) $2x^2 = -2x + 3$

$2x^2 + 2x - 3 = 0$

$a=2$ $b^2 - 4ac$
 $b=2$ $(2)^2 - 4(2)(-3)$
 $c=-3$ $4 - 4(2)(-3)$
 $4 + 24$
 28 \rightarrow NOT a perfect square

2 real irrational solutions (roots)

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

$a=1$ $b^2 - 4ac$
 $b=4$ $(4)^2 - 4(1)(4)$
 $c=4$ $16 - 4(1)(4)$
 $16 - 16$
 0 \rightarrow is a perfect square

1 real rational solution (root)

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

$5x^2 + 3x + 4 = 0$

$a=5$ $b^2 - 4ac$
 $b=3$ $(3)^2 - 4(5)(4)$
 $c=4$ $9 - 4(5)(4)$
 $9 - 80$
 -71

No real solution/root or 2 complex/imaginary roots