

Quadratic Worksheet 1

I. For each problem, find the discriminant and the nature of the roots as to number, real or imaginary and rational or irrational.

1. $4x^2 - 2x + 2 = 0$

$(-2)^2 - [4(4)(2)]$

$D = -28$

2 imag roots

2. $36x^2 - 12x + 1 = 0$

$(-12)^2 - [4(36)(1)]$

$D = 0$

1 real rational

3. $20x^2 + 17x = 3$

$17^2 - [4(20)(-3)]$

$D = 529$

2 real rational.

4. $x^2 + 13 = 4x$

$(-4)^2 - [4(1)(13)]$

$D = -36$

2 imag roots

5. $x^2 = 13x$

$(-13)^2 - [4(1)(0)]$

$D = 169$

2 real rational

6. $7x^2 + 6x + 2 = 0$

$(6)^2 - [4(7)(2)]$

$D = -20$

2 imag roots

II. Give the sum and product of the roots of each equation:

5. $2x^2 - 6x + 5 = 0$

sum = $\frac{6}{2} = 3$

prod = $\frac{5}{2}$

8. $x^2 - 6x = 8$

sum = $\frac{6}{1}$

prod = $-\frac{8}{1}$

9. $2x^2 + 3x = 0$

sum = $-\frac{3}{2}$

prod = $\frac{0}{2}$

10. $4x^2 = 2 - 5x$

sum = $-\frac{5}{4}$

prod = $-\frac{2}{4} = -\frac{1}{2}$

III. State the quadratic equation whose roots have the given sum and product:

6. sum: 3 product: 2

$-\frac{b}{a} = \frac{3}{1}$ $\frac{c}{a} = \frac{2}{1}$

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

12. sum: 0 product: 3

$-\frac{b}{a} = 0$ $\frac{c}{a} = \frac{3}{1}$

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

13. sum: $\frac{2}{3}$ product: $\frac{5}{2}$

$-\frac{b}{a} = \frac{2}{3}$ $\frac{c}{a} = \frac{5}{2}$

(common denom)

$6x^2 - 4x + 15 = 0$

IV. Solve by factoring.

14. $3x^2 = 16x + 12$

$(3x+2)(x-6)$

$x = -2/3$ $x = 6$

15. $7x^2 - 8x = 12$

$(7x+6)(x-2)$

$x = -6/7$ $x = 2$

16. $5x^2 = 23x - 26$

$(5x-13)(x-2)$

$x = 13/5$ $x = 2$

V. Solve by using the quadratic formula.

17. $3x^2 + 2x - 1 = 0$

$x = \frac{-2 \pm \sqrt{4 - [4(3)(-1)]}}{6}$

$x = \frac{-2 \pm 4}{6}$ $x = \frac{-6}{6}$
 $x = \frac{2}{6}$ $x = \frac{2}{3}$

$x = -1$ $x = 1/3$

18. $6x + 5 = -2x^2$

$x = \frac{-6 \pm \sqrt{36 - [4(2)(5)]}}{4}$

$x = \frac{-6 \pm \sqrt{-4}}{4}$ $x = \frac{-6 \pm 2i}{4}$

$x = \frac{-3 \pm i}{2}$

19. $x^2 + 8x = 16$

$x = \frac{-8 \pm \sqrt{64 - [4(1)(16)]}}{2}$

$x = \frac{-8 \pm \sqrt{0}}{2}$

$x = -4 + 4i$ $x = -4 - 4i$