

**W3 –Solving Quadratics using the Quadratic Formula**

Unit 5

MPM2D

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1) Use the quadratic formula to solve each equation. Express answers as approximate roots rounded to 2 decimal places.

**a)**  $7x^2 + 24x + 9 = 0$

**b)**  $2x^2 + 4x - 7 = 0$

**c)**  $4x^2 - 12x + 9 = 0$

**d)**  $2x^2 - 7x = -4$

**e)**  $3x^2 + 5x = 1$

**f)**  $16x^2 + 24x = -9$

**2)** Use the quadratic formula to solve. Express your answers as approximate roots, rounded to the nearest hundredth.

**a)**  $3x^2 + 14x + 5 = 0$

**b)**  $8x^2 + 12x + 1 = 0$

**c)**  $4x^2 - 7x - 1 = 0$

**d)**  $10x^2 - 45x - 7 = 0$

**e)**  $-5x^2 + 16x - 2 = 0$

**f)**  $-6x^2 + 17x + 5 = 0$

**g)**  $x^2 + 5x + 2 = 0$

**h)**  $5x^2 - 3x + 2 = 0$

**3)** Describe the roots of the equation  $ax^2 + bx + c = 0$  in each of the following situations. Explain and justify your reasoning, and give examples to support your answers.

**a)**  $b^2 - 4ac < 0$

**b)**  $b^2 - 4ac = 0$

**c)**  $b^2 - 4ac > 0$  and is a perfect square

**d)**  $b^2 - 4ac > 0$  and is NOT a perfect square

4) Use the discriminant to determine the number of roots for each quadratic equation.

a)  $x^2 - 10x + 25 = 0$

b)  $3x^2 + 4x + \frac{4}{3} = 0$

c)  $2x^2 - 8x + 9 = 0$

d)  $-2x^2 + 0.75x + 5 = 0$

### Answers

1)a)  $-3, \frac{-3}{7}$  b)  $\frac{-4 \pm \sqrt{72}}{4} = \frac{-2 \pm 3\sqrt{2}}{2}; 1.12, -3.12$  c)  $\frac{3}{2}$  d)  $\frac{7 \pm \sqrt{17}}{4}; 2.78, 0.72$  e)  $\frac{-5 \pm \sqrt{37}}{6}; 0.18, -1.85$  f)  $\frac{-3}{4}$

2)a)  $\frac{-7 \pm \sqrt{34}}{3}; -0.39, -4.28$  b)  $\frac{-3 \pm \sqrt{7}}{4}; -0.09, -1.41$  c)  $\frac{7 \pm \sqrt{65}}{8}; 1.88, -0.13$

d)  $\frac{45 \pm \sqrt{2305}}{20}; 4.65, -0.15$  e)  $\frac{-16 \pm \sqrt{216}}{-10} = \frac{8 \pm 3\sqrt{6}}{5}; 0.13, 3.07$  f)  $\frac{17 \pm \sqrt{409}}{12}; 3.1, -0.27$

g)  $\frac{-5 \pm \sqrt{17}}{2}; -0.44, -4.56$  h) no real solutions

3)a) no real solutions b) 1 real solution c) 2 real rational solutions d) 2 real irrational solutions

4)a) one b) one c) none d) two