1) Solve each of the following quadratics using the most appropriate method. Round answers to 2 decimal places when necessary.

a) $0 = x^2 + 7x + 5$

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

c) $6x^2 + x = 1$

d) $4a^2 + 12a = -9$

e) $0 = -2x^2 + 4x + 7$

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

g) $x^2 + 4x - 21 = 0$

h) $-x^2 + 5x + 6 = 0$

i) $0 = 3x^2 + 6x + 4$

j) $x^2 + 11 = 155$

k) $8x^2 = 4x$

l) $3x^2 - x - 7 = 0$

2) Use the discriminant to determine the number of solutions each quadratic equation would have.

a) $x^2 - 4x + 4 = 0$ **b)** $-2x^2 + 3x - 8 = 0$ **c)** $2x^2 + 3x - 8 = 0$

3) Describe the roots of the equation $ax^2 + bx + c = 0$ in each of the following situations. Explain and justify your reasoning.

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

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

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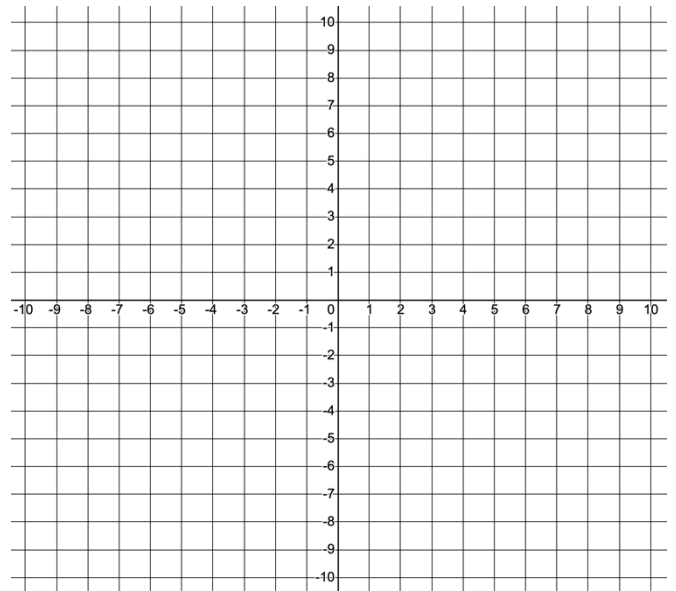
d) $b^2 - 4ac > 0$ and is NOT a perfect square

4) Determine the vertex of each of the following quadratics.
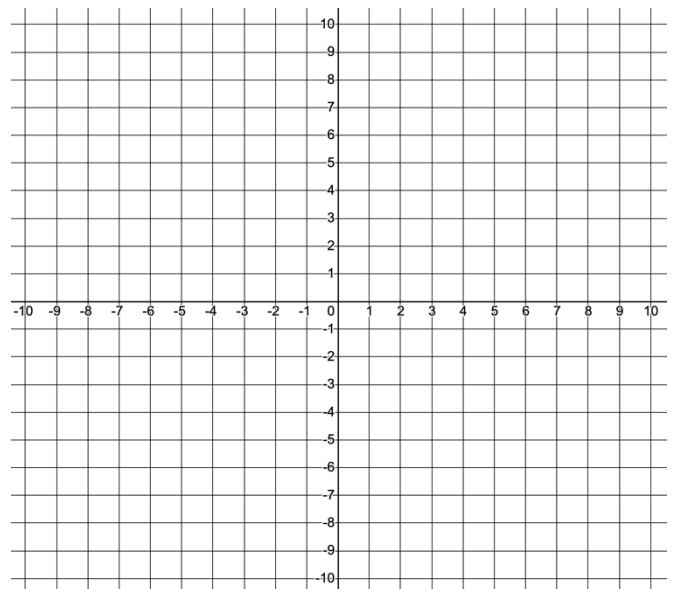
a) $y = 2x^2 - 20x + 7$

b) $y = 3x^2 + 12x - 4$

5) Find the x-intercepts and the vertex of each parabola. Then, sketch its graph.

a) $y = x^2 + 8x + 12$

b) $y = -2x^2 - 6x + 3$

6) Angie sold 1200 tickets for the holiday concert at $20 per ticket. Her committee is planning to increase the prices this year. Their research shows that for each $2 increase in the price of a ticket, 60 fewer tickets will be sold.

a) Determine the revenue relation that describes the ticket sales.

b) What should the selling price per ticket be to maximize revenue?

c) How many tickets will be sold at the maximum revenue?

d) What is the maximum revenue?

7) The path of a golf ball can be modelled by the equation $h = -2d^2 + 12d - 13$, where d represents the horizontal distance, in metres, that the ball travels and h represents the height of the ball, in metres, above the ground. What is the maximum height of the golf ball and at what horizontal distance does it occur?

8) The area of the front cover of a daily journal is 273 cm², and the length is 8 cm greater than the width. What are the dimensions of the cover?

9) A rectangular lawn measuring 8 meters by 4 meters is surrounded by a flower bed of uniform width. The combined area of the lawn and the flower bed is 165 m². What is the width of the flower bed?
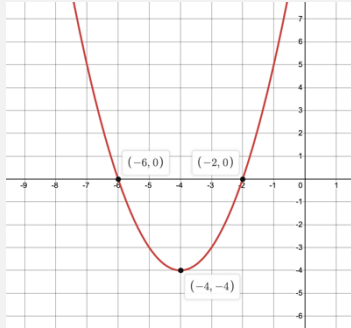
Answers

1)a) $x = -6.19, -0.81$ **b)** $x = -4, -1$ **c)** $x = -\frac{1}{2}, \frac{1}{3}$ **d)** $a = -\frac{3}{2}$ **e)** $x = -1.12, 3.12$ **f)** no real solutions
g) $x = -7, 3$ **h)** $x = -1, 6$ **i)** no real solutions **j)** $x = -12, 12$ **k)** $x = 0, \frac{1}{2}$ **l)** $x = -1.37, 1.70$

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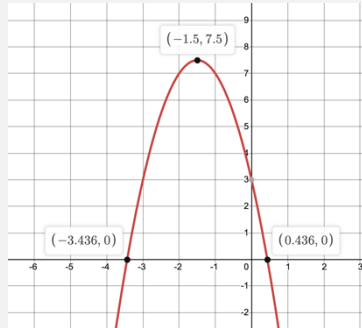
3)a) no real solutions **b)** 1 real solution **c)** 2 real rational solutions **d)** 2 real irrational solutions

4)a) $(5, -43)$ **b)** $(-2, -16)$

5)a)

b)

6)a) $R = (20 + 2x)(1200 - 60x)$ **b)** \$30 **c)** 900 **d)** \$27 000

7) The maximum height of 5 m occurs at a horizontal distance of 3 m.

8) 13 cm by 21 cm

9) 3.5 m