

Assignment Units 5 and 6
**Quadratic Models and
Equations**

Name: _____

Due: Wednesday March 24, 2021

Instructions:

- 1) Print this assignment and answer each question in the space provided.
- 2) If you cannot print the assignment, write complete solutions on separate pieces of paper.
- 3) Please read each question carefully and present your answers in an organized manner.
- 4) Scientific calculators and your notes are permitted.
- 5) Submit your solutions on or before the date March 24th, 2021.

Your Mark:

_____ = %
45

Knowledge (24 marks)

1. State the coordinates of the vertex and identify it as a maximum or minimum value for each of the following quadratic relations. **(2 marks each)**

a) $y = 2(x - 4)^2$

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

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

6

2. Factor each quadratic equation and determine the x-intercepts (zeros). (7 marks)

a) $y = x^2 + 5x - 14$

b) $y = -2x^2 - 4x + 16$

7

3. Rewrite each of the following in standard form by expanding. (6 marks)

a) $y = (3x + 8)(x - 4)$

b) $y = (2x + 3)(3x - 7)$

6

4. Use the quadratic formula to calculate the roots of the given quadratic equation. Round your answer to 2 decimal places. (5 marks)

$$14x^2 - 6x - 12 = 0$$

5

Application (16 marks)

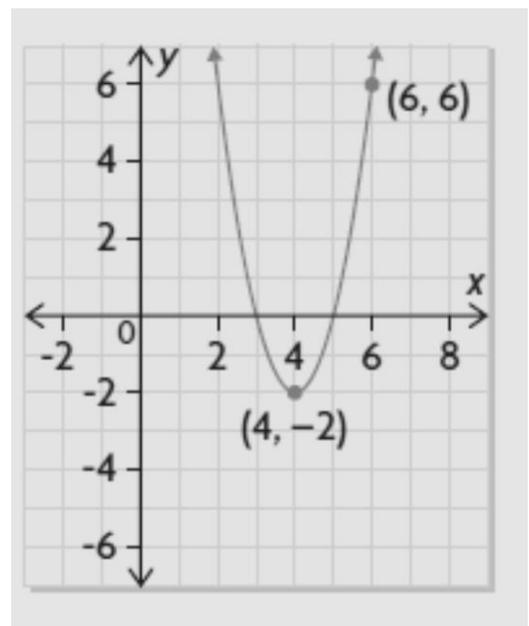
5. Write each quadratic relation in vertex form using the algebraic method of your choice. State the coordinates of the vertex. (4 marks each)

a) $y = 2x^2 + 12x - 14$

b) $y = -2x^2 + 12x - 7$

8

6. Given the graph at right, determine the equation of the transformed parabola in vertex form. (4 marks)



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7. The vertex of a parabola is at $(-3, 2)$, and the parabola passes through the point $(-1, 14)$. Determine the equation for the parabola in vertex form algebraically. (4 marks)

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Communication (5 marks)

8. Match each described translation on the left with the correct quadratic relation on the right by placing a, b, c, or d in the blank space provided. (1 mark each)

- | | |
|--|---|
| a) Vertical stretch by a factor of 2; shift 3 units right; shift 1 unit down. | _____ i) $y = \frac{1}{2}(x + 3)^2 + 1$ |
| b) Reflection; vertical compression by a factor of $\frac{1}{2}$; shift 3 units right; shift 1 unit down. | _____ ii) $y = -\frac{1}{2}(x + 3)^2 - 1$ |
| c) Reflection; vertical stretch by a factor of 2, shift 3 units right; shift 1 unit down. | _____ iii) $y = 2(x - 3)^2 - 1$ |
| d) Reflection; vertical compression by a factor of $\frac{1}{2}$; shift 3 units left; shift 1 unit down. | _____ iv) $y = -2(x - 3)^2 - 1$ |
| e) Vertical compression by a factor of $\frac{1}{2}$; shift 3 units left; shift 1 unit up. | _____ v) $y = -\frac{1}{2}(x - 3)^2 - 1$ |

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