

NAME: _____ PERIOD: _____ DATE: _____

Homework Problem Set

For each equation below, complete the square and then identify the vertex of the quadratic function.

<p>1. $y = 3x^2 - 24x - 1$ $y = 3(x^2 - 8x) - 1$ $y = 3(x^2 - 8x + 16) - 1 - 48$ $y = 3(x - 4)^2 - 49$</p> <p>Vertex: (<u>4</u>, <u>-49</u>)</p>	<p>2. $y = 5x^2 + 20x + 7$ $y = 5(x^2 + 4x) + 7$ $y = 5(x^2 + 4x + 4) + 7 - 20$ $y = 5(x + 2)^2 - 13$</p> <p>Vertex: (<u>-2</u>, <u>-13</u>)</p>	<p>3. $y = 2x^2 + 8x + 5$ $y = 2(x^2 + 4x) + 5$ $y = 2(x^2 + 4x + 4) + 5 - 8$ $y = 2(x + 2)^2 - 3$</p> <p>Vertex: (<u>-2</u>, <u>-3</u>)</p>
<p>4. $y = 7x^2 - 14x + 10$ $y = 7(x^2 - 2x) + 10$ $y = 7(x^2 - 2x + 1) + 10 - 7$ $y = 7(x - 1)^2 + 3$</p> <p>Vertex: (<u>1</u>, <u>3</u>)</p>	<p>5. $y = 3x^2 - 6x - 4$ $y = 3(x^2 - 2x) - 4$ $y = 3(x^2 - 2x + 1) - 4 - 3$ $y = 3(x - 1)^2 - 7$</p> <p>Vertex: (<u>1</u>, <u>-7</u>)</p>	<p>6. $y = 2x^2 + 8x + 1$ $y = 2(x^2 + 4x) + 1$ $y = 2(x^2 + 4x + 4) + 1 - 8$ $y = 2(x + 2)^2 - 7$</p> <p>Vertex: (<u>-2</u>, <u>-7</u>)</p>
<p>7. $y = 5x^2 - 10x + 15$ $y = 5(x^2 - 2x) + 15$ $y = 5(x^2 - 2x + 1) + 15 - 5$ $y = 5(x - 1)^2 + 10$</p> <p>Vertex: (<u>1</u>, <u>10</u>)</p>	<p>8. $y = 2x^2 - 12x - 13$ $y = 2(x^2 - 6x) - 13$ $y = 2(x^2 - 6x + 9) - 13 - 18$ $y = 2(x - 3)^2 - 31$</p> <p>Vertex: (<u>3</u>, <u>-31</u>)</p>	<p>9. $y = x^2 + 8x + 19$ $y = (x^2 + 8x) + 19$ $y = (x^2 + 8x + 16) + 19 - 16$ $y = (x + 4)^2 + 3$</p> <p>Vertex: (<u>-4</u>, <u>3</u>)</p>

Challenge Problems

Rewrite each expression by completing the square.

10. $4x^2 - 12x + 9$

$4(x^2 - 3x) + 9$

$4(x^2 - 3x + \frac{9}{4}) + 9 - \frac{36}{4}$

$$4(x - \frac{3}{2})^2$$

11. $25k^2 - 75k + 10$

$25(k^2 - 3k) + 10$

$25(k^2 - 3k + \frac{9}{4}) + 10 - \frac{225}{4}$

$$25(k - \frac{3}{2})^2 - \frac{185}{4}$$

12. $3b^2 + 21b - 5$

$3(b^2 + 7b) - 5$

$3(b^2 + 7b + \frac{49}{4}) - 5 - \frac{147}{4}$

$$3(b + \frac{7}{2})^2 - \frac{167}{4}$$

13. $100c^2 - 500c + 625$

$100(c^2 - 5c) + 625$

$100(c^2 - 5c + \frac{25}{4}) + 625 - 625$

$$100(c - \frac{5}{2})^2$$

14. $8n^2 + 4n + 5$

$8(n^2 + \frac{1}{2}n) + 5$

$8(n^2 + \frac{1}{2}n + \frac{1}{16}) + 5 - \frac{1}{2}$

$$8(n + \frac{1}{4})^2 + \frac{9}{2}$$