

W8D2 Vertex Form

Warm Up

1. Solve $x^2 + 10x = 48$
2. What is the vertex of $y = 3(x - 4)^2 - 5$
1. $x = -5 \pm 6\sqrt{2}$
2. (4,-5)

Vertex Form Worksheet Inquiry

Write in vertex form. Find the vertex then rewrite the equation in vertex form.

1. $y = x^2 + 8x + 10$
2. $y = x^2 + 8x - 2$
3. $y = x^2 - 20x + 80$
4. $y = x^2 - 10x + 25$
5. $y = x^2 - 12x + 36$

answers

1. $y = (x + 4)^2 - 6$
2. $y = (x + 4)^2 - 18$
3. $y = (x - 10)^2 - 20$
4. $y = (x - 5)^2$
5. $y = (x - 6)^2$

Notice the last two are perfect square trinomials. So we could complete the square to get that $(x - h)^2$

Lesson 16 Complete the Square

Vertex Form

EX 1:

$$\begin{aligned}y &= x^2 + 16x - 6 \\y + 6 &= x^2 + 16x \\y + 6 + \mathbf{64} &= x^2 + 16x + 64 \\y + 70 &= (x + 8)^2 \\y &= (x + 8)^2 - 70\end{aligned}$$

EX 2:

$$\begin{aligned}y &= x^2 - 4x - 9 \\y + 9 + \mathbf{4} &= x^2 - 4x + 4 \\y + 13 &= (x - 2)^2 \\y &= (x - 2)^2 - 13\end{aligned}$$

EX 3:

$$\begin{aligned}y &= x^2 + 6x + 14 \\y - 14 + \mathbf{9} &= x^2 + 6x + 9 \\y - 5 &= (x + 3)^2 \\y &= (x + 3)^2 + 5\end{aligned}$$

EX 4:

$$\begin{aligned}y &= 3x^2 + 6x + 7 \\y - 7 + \mathbf{3} &= 3(x^2 + 2x + 1) \\y - 4 &= (x + 1)^2 \\y &= (x + 1)^2 + 4\end{aligned}$$

EX 5:

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

$$y - 8 + \mathbf{18} = 2(x^2 + 6x + 9)$$

$$y + 10 = (x + 3)^2$$

$$y = (x + 3)^2 - 10$$

Write in vertex form and graph

1. $y = x^2 - 4x + 2$
2. $y = x^2 + 6x + 1$
3. $y = x^2 + 2x + 5$
4. $y = 2x^2 + 8x - 3$
5. $y = -x^2 - 4x + 2$

QUIZ

- | | |
|-------------------------|----------------------------------------------------------------|
| 1. $-2(x + 2) + 1 = -9$ | $x = -2 \pm \sqrt{5}$ |
| 2. $(x-3)^2 + 4 = 36$ | $3 \pm 4\sqrt{2}$ |
| 3. $3(x+4)^2 + 10 = 22$ | $-4 \pm 2\sqrt{\quad}$ |
| 4. $3(x+2)^2 + 12 = 3$ | <i>no \pm real $\sqrt{\text{sol}}$</i> |
| 5. $4(x-6)^2 + 7 = 15$ | $6 \pm \sqrt{2}$ |
| 6. $(x-16)^2 - 1 = 29$ | $16 \pm \sqrt{30}$ |
| 7. $5(x-10)^2 + 4 = 84$ | $10 \pm 4\sqrt{\quad}$ |
| 8. $3(x+8)^2 + 6 = 6$ | $-8 \pm \sqrt{\quad}$ |
| 9. $-2(x+1)^2 + 14 = 2$ | $-1 \pm \sqrt{6}$ |
| 10. $5(x-3)^2 + 7 = 12$ | $3 \pm 1\sqrt{\quad}$ |

Finish Worksheet

Exit Pass

1. Find the vertex $x^2 + 10x + \text{blank} = (x - \text{blank})^2$ 25, 5
2. Solve for x $x^2 + 6x = 72$ $(x + 3)^2 = 81$ $x = 6, -12$