

Put the formula for each parabola into vertex form

$$y = a(x - h)^2 + k$$

by completing the square.

Then give the value of a and the vertex:

1) $y = x^2 - 16x - 40$

By “my” method:

$$y = (x^2 - 16x + 64) - 40 - 64$$

$$y = (x - 8)^2 - 104$$

$$a = 1$$

$$\text{vertex: } (8, -104)$$

By the method used in the WeBWorK:

$$y + 40 = x^2 - 16x$$

$$y + 40 + 64 = x^2 - 16x + 64$$

$$y + 104 = (x - 8)^2$$

$$y = (x - 8)^2 - 104$$

$$a = 1$$

$$\text{vertex: } (8, -104)$$

2) $y = x^2 + 5x + 2$

By “my” method:

$$y = \left(x^2 + 5x + \frac{25}{4}\right) + 2 - \frac{25}{4}$$

$$y = \left(x + \frac{5}{2}\right)^2 + \frac{8}{4} - \frac{25}{4}$$

$$y = \left(x + \frac{5}{2}\right)^2 - \frac{17}{4}$$

$$a = 1$$

$$\text{vertex: } \left(-\frac{5}{2}, -\frac{17}{4}\right)$$

By the method used in the WeBWork:

$$y - 2 = x^2 + 5x$$

$$y - 2 + \frac{25}{4} = x^2 + 5x + \frac{25}{4}$$

$$y - \frac{8}{4} + \frac{25}{4} = \left(x + \frac{5}{2}\right)^2$$

$$y + \frac{17}{4} = \left(x + \frac{5}{2}\right)^2$$

$$y = \left(x + \frac{5}{2}\right)^2 - \frac{17}{4}$$

$$a = 1$$

$$\text{vertex: } \left(-\frac{5}{2}, -\frac{17}{4}\right)$$
