MATH 102, Spring 2023 **Name:** _____
In class work 6 **Row and Seat:** _____

In class work 6 has questions 1 through 1 with a total of 8 points. This assignment is due at the end of the class period (9:55 AM).

1. Find the *vertex* of each parabola

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

Solution: Matching $y-8=x^2$ to $y-k=a(x-h)^2$ gives $k=8$, $h=0$, and $a=1$. So the vertex is the point $(0,8)$.

2 (b) $y-8=\sqrt{2}(x+2)^2$

Solution: Matching $y-8=\sqrt{2}(x+2)^2$ to $y-k=a(x-h)^2$ gives $k=8$, $h=-2$, and $a=\sqrt{2}$. So the vertex is the point $(-2,8)$.

2 (c) $y=2x^2-28x+103$

Solution: Matching $y=2x^2-28x+103$ to $y=ax^2+bx+c$ gives $a=2$, $b=-28$, and $c=103$. The vertex is the point

$$\left(-\frac{b}{2a},c-\frac{b^2}{4a}\right)=\left(-\frac{-28}{2\times 2},103-\frac{(-28)^2}{4\times 2}\right)=(7,5)\,. \tag{1}$$

2 (d) $y=3(x-2)(x-4)$

Solution: To match $y=3(x-2)(x-4)$ to $y=ax^2+bx+c$, we need to expand (use FOIL) $y=3(x-2)(x-4)$. We have

$$y=3(x-2)(x-4)=3(x^2-6x+8)=3x^2-18x+24.$$

So $a=3$, $b=-18$, and $c=24$. The vertex is the point

$$\left(-\frac{b}{2a},c-\frac{b^2}{4a}\right)=\left(-\frac{-18}{2\times 3},24-\frac{(-18)^2}{4\times 3}\right)=(3,-3)\,.$$