Completing the square - B IB Studies/SL/HL

1. a) Write the equation $y = x^2 - 5x + 6$ in the form $y = a(x + p)^2 + q$.

   b) Sketch the graph of the equation $y = x^2 - 5x + 6$.

   c) Write the coordinates of the minimum point of the curve.

2. a) Write the equation $y = x^2 + 3x + 2$ in the form $y = a(x + p)^2 + q$.

   b) Sketch the graph of the equation $y = x^2 + 3x + 2$.

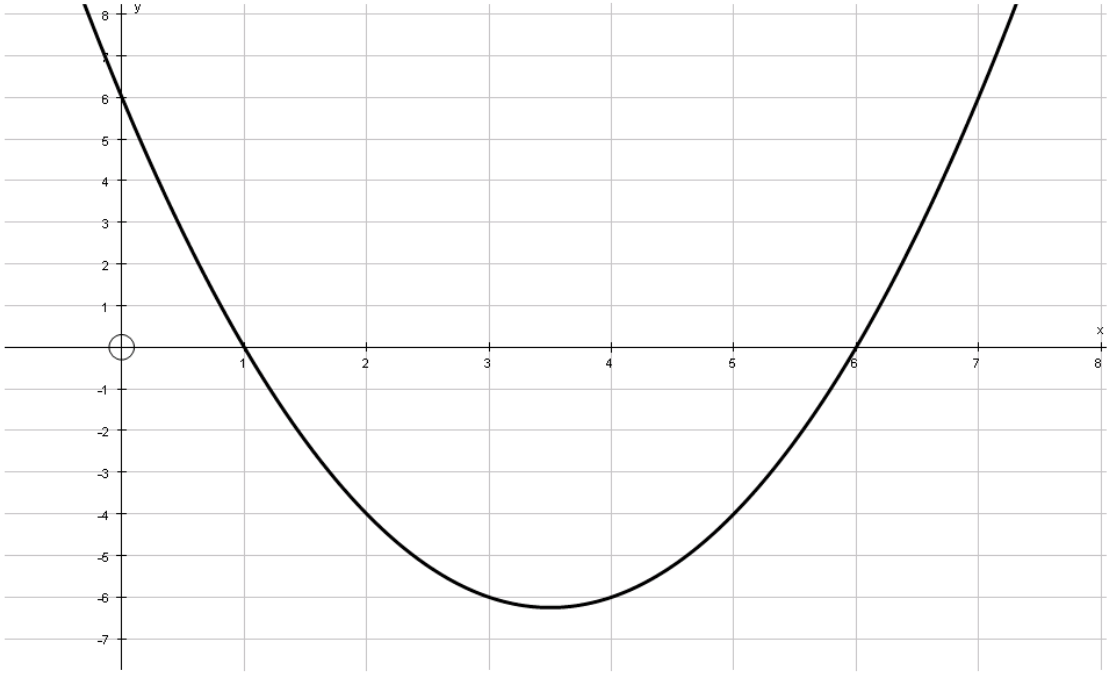
   c) Write the coordinates of the minimum point of the curve.

3.* a) Write the equation $y = 2x^2 + 9x - 5$ in the form $y = a(x + p)^2 + q$.

   b) Sketch the graph of the equation $y = 2x^2 + 9x - 5$.

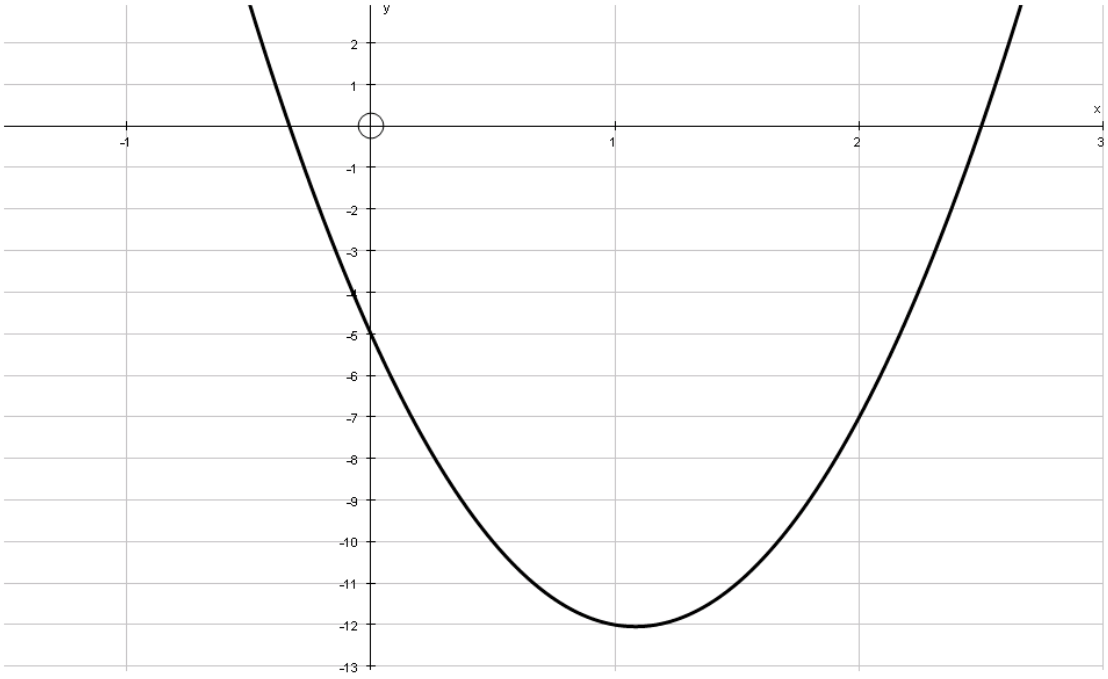
   c) Write the coordinates of the minimum point of the curve.

4. Below is a graph of $y = f(x)$.



Write the function in the form $y = a(x + p)^2 + q$, where a, p, q are real numbers.

5.* Below is a graph of $y = f(x)$.



Write the function in the form $y = a\left(x + p\right)^2 + q$, where a, p, q are real numbers.

6. a) Write the equation $f(x) = x^2 - 7x + 10$ in the form $f(x) = a(x + p)^2 + q$.

b) Find the inverse of $f^{-1}(x)$.

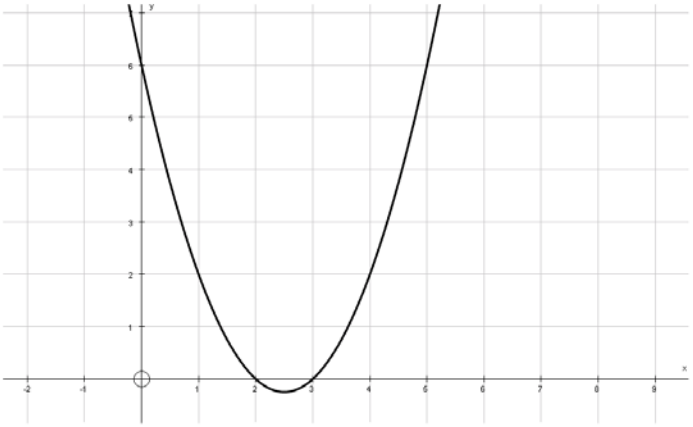
7.* $f(x) = x^2 - 2x - 24$, find $f^{-1}(x)$.

8.** $f(x) = \left(3x - 2\right)\left(2x + 5\right)$, find $f^{-1}(x)$.

Answers

1. a) $y = \left(x - \frac{5}{2}\right)^2 - \frac{1}{4}$

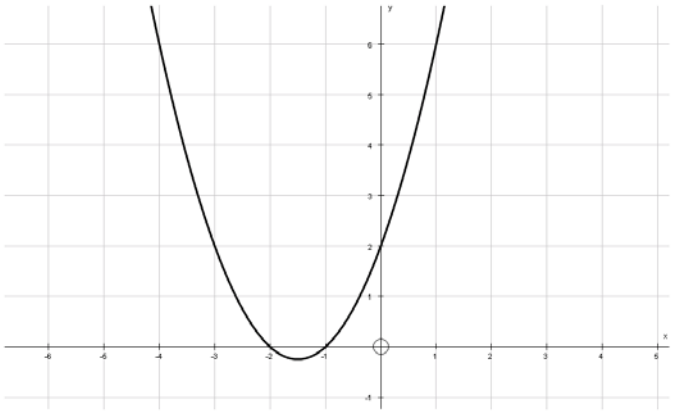
b)



c) $\left(\frac{5}{2}, -\frac{1}{4}\right)$

2. a) $y = \left(x + \frac{3}{2}\right)^2 - \frac{1}{4}$

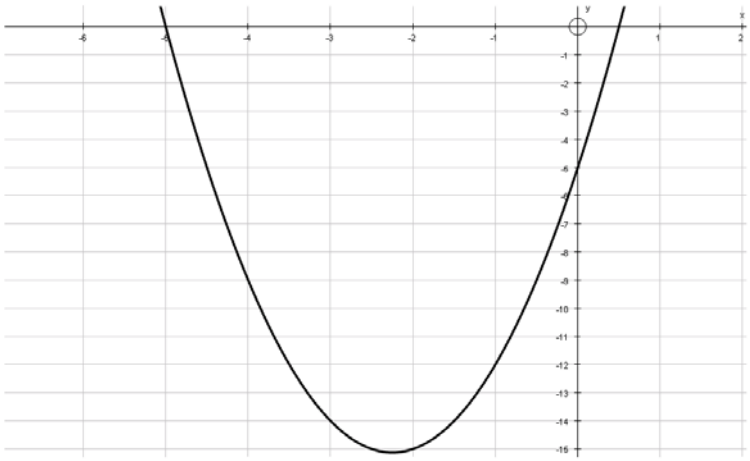
b)



c) $\left(-\frac{3}{2}, -\frac{1}{4}\right)$

3. a) $y = 2\left(x + \frac{9}{4}\right)^2 - \frac{121}{8}$

b)



c) $\left(-\frac{9}{4}, -\frac{121}{8}\right)$

4. $y = \left(x - \frac{7}{2}\right)^2 - \frac{25}{4}$

5. $y = \left(x - \frac{13}{12}\right)^2 - \frac{289}{24}$

6. a) $f(x) = \left(x - \frac{7}{2}\right)^2 - \frac{9}{4}$

b) $f^{-1}(x) = \frac{7}{2} + \sqrt{x + \frac{9}{4}}$

7. $f^{-1}(x) = 1 + \sqrt{x + 25}$

8. $f^{-1}(x) = \sqrt{\frac{x}{6} + \frac{361}{24}} - \frac{11}{12}$