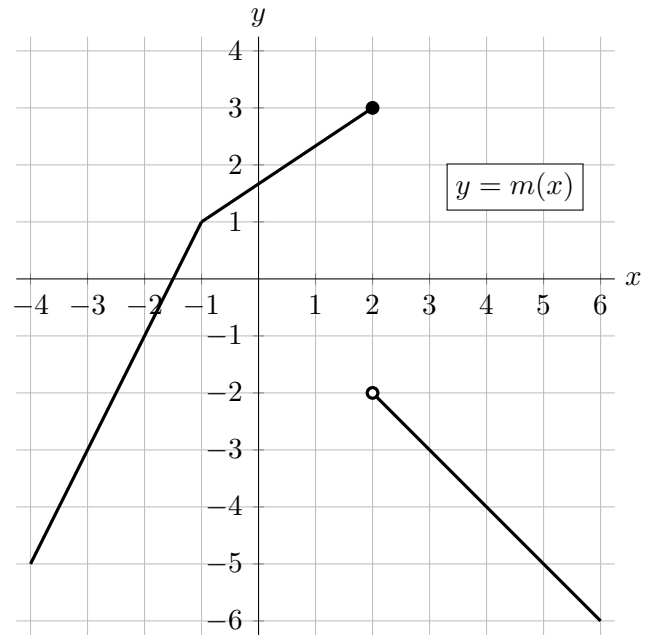


2. [11 points]

The function $m(x)$ is defined on $(-\infty, \infty)$.

A portion of the graph of the function $m(x)$ is shown.

Note that $m(x)$ is linear on the intervals $(-4, -1)$, $(-1, 2)$ and $(2, 6)$.



a. [8 points] Evaluate each of the following quantities exactly, or write DNE if the value does not exist. You do not need to show work, but limited partial credit may be awarded for work shown. Your answers should not contain the letter m , but do not need to be fully simplified.

i. [2 points] Let $v(x) = x^3m(x)$. Compute $v'(4)$.

Answer: $v'(4) =$ _____

ii. [2 points] Let $u(x) = 5m(x - 1) + 8$. Compute $u'(3)$.

Answer: $u'(3) =$ _____

iii. [2 points] Let $w(x) = \frac{1}{m(x)}$. Compute $w'(-3)$.

Answer: $w'(-3) =$ _____

iv. [2 points] Let $r(x) = \sin(\pi m(x))$. Compute $r'(-2)$.

Answer: $r'(-2) =$ _____

b. [3 points] Suppose $j(x)$ is a function whose derivative is given by the above graph (i.e. $j'(x) = m(x)$). Find a formula for $Q(x)$, the quadratic approximation of $j(x)$ at $x = 5$, assuming $j(5) = 4$.

Answer: $Q(x) =$ _____