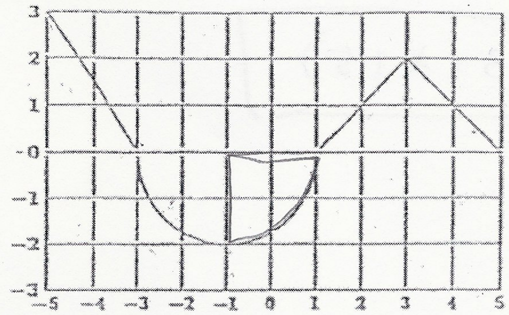
Additional Justification and Accumulation Practice Name: key

Per:__________

Let g be a differentiable function defined on [-5, 5] such that $g(-1) = 2$. The graph of g' below consists of line segments and a half circle.



a) Find $g(5)$ and $g'(5)$.
b) Find $\int_{-5}^{5} g'(x)dx$.
c) Find the value of $g''(-4)$, $g''(-1)$ and $g''(3)$ or state that it does not exist.
d) Find the x-coordinate of each relative extrema on the graph of g. Justify your answer.
e) On what intervals, if any, is g increasing? Justify.
f) At $x = 1$, is there a point of inflection on the graph of g? Explain your reasoning.
g) On what intervals, if any, is g concave up? Justify.
h) Find the absolute minimum <u>value</u> of g on the interval [-5,5]. Show all work that leads to your answer.
i) Write an equation for the line tangent to the graph of g at $x = -5$.

(a) $g(5) = g(-1) + \int_{-1}^{5} g'(x)dx = 2 + -\frac{1}{4}\pi(2)^2 + \frac{1}{2}(4)(2) = \boxed{6 - \pi}$

$g'(5) = \boxed{0}$

(b) $\int_{-5}^{5} g'(x)dx = \frac{1}{2}(3)(2) - \frac{1}{2}\pi(2)^2 + \frac{1}{2}(4)(2) = \boxed{7 - 2\pi}$

(c) $g''(-4) = -3/2$ $g''(-1) = 0$ $g''(3) = DNE$

(d) Relative Max at $x=-3$ since g' changes from pos to neg and
Relative Min at $x=1$ since g' changes from neg to pos

(e) g is increasing from $(-5,-3) \cup (1,5)$ since g' is positive

(f) No point of inflection at $x=1$ since g' is not changing from inc to dec or dec to inc

(g) g is concave up from **(-1,1) U (1,3)** since g' is increasing

(h) $g(-5) = g(-1) - \int_{-5}^{-1} g'(x)dx = 2 - \left[\frac{1}{2}(3)(2) - \frac{1}{4}\pi(2)^2\right] = 2 - 3 + \pi = -1 + \pi$

$g(5) = 6 - \pi$

$g(1) = g(-1) + \int^{5} g'(x)dx = 2 + \left[-\frac{1}{4}\pi(2)^2\right] = 2 - \pi$ $\boxed{\text{Abs. Min: } 2 - \pi}$

(i) $g(-5) = -1 + \pi \quad g'(-5) = 3$

$$\boxed{y + 1 - \pi = 3(x+5)}$$