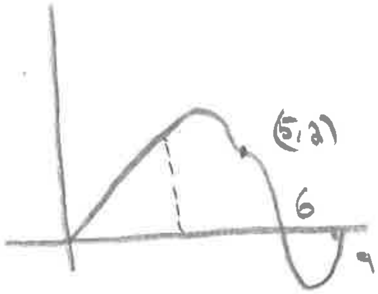
(58) $s(t) = \int_0^t f(x)\,dx$ = position



a) $v(5) = s'(5) = f(5) = 2$

b) $a(5) = s''(5) = f'(5)$
since f is decreasing at $x=5$, $a(5) < 0$

c) $s(3) = \int_0^3 f(x)\,dx$ = area under curve from $x=0$ to $x=3$. $A = \frac{1}{2}(3)(3) = \frac{9}{2}$

d) Largest value at $t=6$

e) $a(t) = s''(t) = f'(t)$. Look for max/mins of $f(t)$.
$t=4$, $t=7$

f) Away from origin from $(0,6)$ (since $\int_0^6 f(x)\,dx > 0$) and toward origin from $(6,9)$.

g) To the right since more area above curve than below on $(0,9)$

(59) a) $v(3) = s'(3) = f(3) = 0$

b) $a(3) = s''(3) = f'(3)$ and since f is increasing at $t=3$, $a(3) > 0$

c) $s(3) = \int_0^3 f(x)\,dx$
$= -\frac{1}{2}(6)(3) = -9$

d) at $t=6$, $\int_0^6 f(t)\,dt = 0$

e) $a(t) = s''(t) = f'(x)$
max/mins of f at
$t=7$

f) Away from origin on $(0,3)$, toward origin on $(3,6)$ and then away again $(6,9)$

g) To the right; more area above on $(0,9)$

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(65) True, FTC says if F is differentiable, it is also continuous.

(66) False. $\int_a^b e^{x^2}\,dx$ is a value, so derivative always equals 0.

(67) $f(x) = \int_a^x \ln(2+\sin t)\,dt$

$f(3) = \int_a^3 \ln(2+\sin t)\,dt = 4$

$f(5) = \int_a^5 \ln(2+\sin t)\,dt = \int_a^3 + \int_3^5$

$= 4 + \int_3^5 \ln(2+\sin t)\,dt$

$= 4.555$ (D)

(68) $\lim_{h\to 0} \frac{1}{h}\int_x^{x+h} f(t)\,dt = \frac{d}{dx}\int_a^x f(t)\,dt = f(x)$ (D)

(69) $f(\pi) = \int_\pi^\pi \cos^3 t\,dt = 0$

$f'(\pi) = \cos^3(\pi) = -1$

$y - 0 = -(x-\pi)$

$y = -x + \pi$ (E)

(70) $A = \int_{-1}^{1} \sqrt{1-x^4} = 1.748$ (E)