Unit 6 - Week 4

Assignment 4

The due date for submitting this assignment has passed.
As per our records you have not submitted this assignment.

Due on 2020-02-26, 23:59 IST.

1) Assume that $W^{(1)}$ and $W^{(2)}$ are independent standard Brownian motions, If $X_t^{(i)} = \int_0^t u_i(s)dW_s^{(1)} + \int_0^t v_i(s)dW_s^{(2)}, i = 1, 2$ then $\langle X^{(1)}, X^{(2)} \rangle_t$ is equal to **2 points**

- $\int_0^t (u_1(s)u_2(s) + v_1(s)v_2(s))ds$
- $\int_0^t (u_1(s)v_1(s) + u_2(s)v_2(s))ds$
- $\int_0^t (u_1(s)v_2(s) + u_2(s)v_1(s))ds$
- $\int_0^t (u_1(s)u_2(s) - v_2(s)v_1(s))ds$

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\int_0^t (u_1(s)u_2(s) + v_1(s)v_2(s))ds$

2) Let $f \in C^2(\mathbb{R}^d)$. If $v = I_d$ (d dimensional identity matrix) then $\sum_{i,j}(vv^*)_{ij}\frac{\partial^2 f}{\partial x_i \partial x_j}$ is same as **2 points**

- Δf
- trace of Hessian of f
- $\vec{\nabla}.(\nabla f)$
- $\sum_{i=1}\sum_{j=1}\frac{\partial^2 f}{\partial x_i \partial x_j}$

No, the answer is incorrect.
Score: 0
Accepted Answers:
Δf
trace of Hessian of f
$\vec{\nabla}.(\nabla f)$

3) If τ is an unbounded $\{\mathcal{F}_t\}$-stopping time with finite expectation, Then EW_τ is **2 points**

- zero
- need not be zero but finite
- infinite
- $E\tau$

No, the answer is incorrect.
Score: 0
Accepted Answers:
zero

4) Let D be an open subset of $\mathbb{R}^d$ and $\tau_D := \inf\{t \geq 0 | W_t \notin D\}$. Then for any $x \notin D$, τ_D **2 points**

- is equal to zero
- need not ne zero but finite positive value with probability 1
- is such that $0 < E\tau_D < \infty$
- $E\tau_D$ could be infinite

No, the answer is incorrect.
Score: 0
Accepted Answers:
is equal to zero

5) Let B_r be the open disc of radius r around origin in $\mathbb{R}^2$ and $\mu_r(A) := P[W_{\tau_{B_r}} \in A | W_0 = 0] \quad \forall A \in \mathcal{B}_{B_r}$. If $\theta \in (0, \frac{\pi}{2})$ and $A_\theta = \{(x, y) \in B_r | 0 < y < r\sin\theta\}$, then $\mu_r(A_\theta)$ is equal to, **2 points**

- $r\theta$
- $2r\theta$
- $\frac{\theta}{\pi}$
- $r\sin\theta$
- $2r\sin\theta$
- 2θ

No, the answer is incorrect.
Score: 0
Accepted Answers:
$\frac{\theta}{\pi}$