Application of Derivatives
Part - 3

In the following questions, a statement of Assertion (A) is followed by a statement of Reason (R). Choose the correct answer out of the following choices.

(a) *Both A and R are true and R is the correct explanation of A.*
(b) *Both A and R are true but R is not the correct explanation of A.*
(c) *A is true but R is false.*
(d) *A is false and R is also false.*

1. **Assertion (A):** The rate of change of area of a circle with respect to its radius r when $r = 6$ cm is 12π cm^2/cm.

   Reason (R): Rate of change of area of a circle with respect to its radius r is $\dfrac{dA}{dr}$, where A is the area of the circle.

2. **Assertion (A):** $f(x) = \tan x - x$ always increases.

   Reason (R): Any function $y = f(x)$ is increasing if $\dfrac{dy}{dx} > 0$.

3. **Assertion (A):** $f(x) = x^4$ is decreasing in the interval $(0, \infty)$.

   Reason (R): Any function $y = f(x)$ is decreasing if $\dfrac{dy}{dx} < 0$.

4. **Assertion (A):** The slope of the tangent to the curve $y = x^3$ where it cuts x-axis, is 0.

   Reason (R): Slope of tangent to the curve $y = f(x)$ at point (x_0, y_0) is $\dfrac{dy}{dx}$ at (x_0, y_0).

Answers

1. (a)   2. (a)   3. (d)   4. (a)