Answer on Question #60512 – Math – Calculus

Evaluate each of the following function at given values of the independent variables.

Question 1

$f(t) = \frac{t}{f^2} - 1$

Find:

- **a.** $f(-x)$
- **b.** $f(t-2)$
- **c.** $-f\left(\frac{2}{x}\right)$

Solution

a.

$$f(-x) = \frac{-x}{f^2} - 1 = -\left(1 + \frac{x}{f^2}\right)$$

b.

$$f(t-2) = \frac{t-2}{f^2} - 1$$

c.

$$-f\left(\frac{2}{x}\right) = -\left(\frac{\frac{2}{x}}{f^2} - 1\right) = 1 - \frac{2}{xf^2}$$

Answer: a. $-\left(1 + \frac{x}{f^2}\right)$; **b.** $\frac{t-2}{f^2} - 1$; **c.** $1 - \frac{2}{xf^2}$.

Question 2

$R(y) = (n^2 y - sin^2 y)$

Find:

a. $R(0)$;

b. $R(\pi)$;

c. $R(-\pi)$;

d. $R\left(\frac{\pi}{2}\right)$;

e. $R\left(\frac{\pi}{3}\right)$;

f. $R\left(\frac{\pi}{4}\right)$;

g. $R\left(\frac{\pi}{6}\right)$;

h. $R(\pi - x)$;

i. $R\left(\frac{\pi}{2} + x\right)$;

j. $R(\pi + x)$;

Solution

a.

$$R(0) = (n^2 0 - sin^2 0) = 0$$

b.

$$R(\pi) = (n^2\pi - sin^2\pi) = n^2\pi$$

c.

$$R(-pi) = (-n^2\pi - sin^2(-\pi)) = -n^2\pi$$

d.

$$R\left(\frac{\pi}{2}\right) = \left(\frac{n^2\pi}{2} - sin^2\frac{\pi}{2}\right) = \frac{n^2\pi}{2} - 1$$

e.

$$R\left(\frac{\pi}{3}\right) = \left(\frac{n^2\pi}{3} - sin^2\frac{\pi}{3}\right) = \frac{n^2\pi}{3} - \frac{3}{4}$$

f.

$$R\left(\frac{\pi}{4}\right) = \left(\frac{n^2\pi}{4} - sin^2\frac{\pi}{4}\right) = \frac{n^2\pi}{4} - \frac{1}{2}$$

g.

$$R\left(\frac{\pi}{6}\right) = \left(\frac{n^2\pi}{6} - sin^2\frac{\pi}{6}\right) = \frac{n^2\pi}{6} - \frac{1}{4}$$

h.

$$R(\pi - x) = \left(n^2(\pi - x) - sin^2(\pi - x)\right) = n^2(\pi - x) - sin^2 x$$

i.

$$R\left(\frac{\pi}{2} + x\right) = \left(n^2\left(\frac{\pi}{2} + x\right) - sin^2\left(\frac{\pi}{2} + x\right)\right) = n^2\left(\frac{\pi}{2} + x\right) - \cos^2 x$$

j.

$$R(\pi + x) = \left(n^2(\pi + x) - sin^2(\pi + x)\right) = n^2(\pi + x) - sin^2 x$$

Answer: a. 0; **b.** $n^2\pi$; **c.** $-n^2\pi$; **d.** $\frac{n^2\pi}{2}-1$; **e.** $\frac{n^2\pi}{3}-\frac{3}{4}$; **f.** $\frac{n^2\pi}{4}-\frac{1}{2}$; **g.** $\frac{n^2\pi}{6}-\frac{1}{4}$;

h. $n^2(\pi-x)-sin^2x$; **i.** $n^2\left(\frac{\pi}{2}+x\right)-\cos^2 x$; **j.** $n^2(\pi+x)-sin^2x$.

Question 3

$g(y)=2^y-2^{-y}$

Find:

- **a.** $g(2)$;
- **b.** $g(-1)$.

Solution

a.

$$g(2)=2^2-2^{-2}=4-\frac{1}{4}=\frac{15}{4}$$

b.

$$g(-1)=2^{-1}-2^1=\frac{1}{2}-2=-\frac{3}{2}$$

Answer: a. $\frac{15}{4}$; **b.** $-\frac{3}{2}$.

Question 4

$f(x)=3^x-1$

Find:

$f(1)+f(2)$

Solution

$$f(1)+f(2)=3^{1-1}+3^{2-1}=1+3=4$$

Answer: 4.

Question 5

If $f(x)=\frac{1}{\sqrt{x-1}}$

Find:

$$\frac{f(x)-f(2)}{x-2}$$

Solution

$$\frac{f(x)-f(2)}{x-2}=\frac{\frac{1}{\sqrt{x-1}}-\frac{1}{\sqrt{2-1}}}{x-2}=\frac{\frac{1}{\sqrt{x-1}}-1}{x-2}.$$

Answer: $\frac{\frac{1}{\sqrt{x-1}}-1}{x-2}$.