**Câu 1.** Given $f(u) = u^2, g(x) = x^5 + 2$, find $(f \circ g)'(1)$

A. 6
B. 15
C. 30
D. None of the other choices is correct
E. -30

**Câu 2.** Find the relative extrema, if they exist, of the function $f(x) = \frac{8x}{x^2+1}$

A. Relative minimum at (-1, -4), relative maximum at (1, 4)
B. Relative minimum at (-1, -4), relative maximum at (0, 0)
C. Relative maximum at (-1, -4), relative minimum at (1, 4)
D. Relative maximum at (0, 0), no relative minimum
E. None of the other choices is correct

**Câu 3.** Evaluate the limit, if it exists: $\lim_{x\to 1} \frac{\sqrt{x^2+3x}-2}{x-1}$

A. 0
B. 5/2
C. 5/4
D. -5/2
E. None of the other choices is correct
F. -5/4

**Câu 4.** A table of values for f, g, f', g' is given:

| x | f(x) | g(x) | f'(x) | g'(x) |
|---|---|---|---|---|
| 0 | 1 | 1 | 2 | -2 |
| 1 | 0 | 2 | 3 | -1 |
| 2 | 4 | -1 | 5 | 6 |

Find h'(1) if h(x) = g(f (x)).

A. 0
B. -6
C. None determined
D. -2
E. None of the other choices is correct
F. -5

**Câu 5.** Find dy/dx by implicit differentiation $xy^2 = 4$.

A. None of the other choices is correct
B. -2y/x
C. 2x/y
D. –y/(2x)

E. x/(2y)

**Câu 6.** Use the Simpson's Rule with n = 4 to approximate the integral:

$$\int_1^5 xcosxdx$$

A. None of the other choices is correct
B. -5.92
C. -6.26
D. -3.43
E. -6.89

**Câu 7.** Simplify the quotient $\frac{f(x+h)-f(x)}{h}$ for $f(x) = \frac{1}{x}$

(i) $\frac{-1}{(x-h)x}$ (ii)$\frac{1}{(x+h)x}$ (iii)$\frac{-1}{(x+h)x}$ (iv)$\frac{-1}{(x+h)(x-h)}$

A. (iii)
B. (iv)
C. (i)
D. (ii)
E. None of the choices is correct

**Câu 8.** Find the vertical asymptotes to the graph of the following function:

$$f(x) = \frac{x-4}{6-\sqrt{x}-x}$$

A. x = -4 and x = 6
B. x = 4 and x = 6
C. x = 4 and x = -6
D. Does not exist

**Câu 9.** Find the <u>average value</u> of the function f(x) = 7x + 5 on the interval [1;4]
A. 7
B. None of the other choices is correct
C. 22.5
D. 2
E. 14
F. 4

**Câu 10.** Express the limit as a definite integral on the given interval.

$$\lim_{n\to\infty} \sum_{i=1}^{n} \cos^2(2\pi x_i^*)\,\Delta x$$

(i)$\int_0^1 \cos^2(2\pi)dx$ (ii)$\int_0^1 \cos^2\left(\frac{2\pi}{x}\right)dx$ (iii)$\int_{-1}^1 \cos^2(2\pi x)dx$ (iv) $\int_0^1 \cos^2(2\pi x)dx$

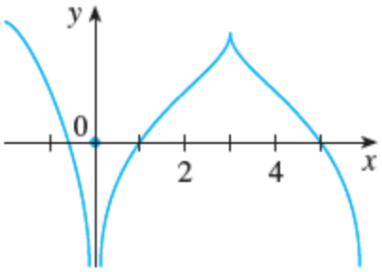
A. (iv)
B. (iii)
C. (i)
D. None of the other choices is correct
E. (ii)

**Câu 11.** A particle is moving with the given data. Find the position function s(t) of the particle.

v(t) = 3sint – 5cost, s(π) = 1

A. s(t) = 3cost + 5sint – 2
B. s(t) = 3cost – 5sint – 2
C. s(t) = -3cost – 5sint + 4
D. None of others
E. s(t) = 3cost – 5sint – 2

**Câu 12.** The graph of f(x) is given. State the numbers at which f(x) is <u>not</u> differentiable




A. 0; 1; 3; 4
B. 0; 3
C. 3
D. 0; 2; 4
E. None of the other choices is correct

**Câu 13.** Using the Midpoint Rule with n = 4 to approximate

$$\int_1^5 (x + 0.5)dx$$

A. 14
B. 12
C. 16
D. None of the choices is correct
E. 20

**Câu 14.** Which of the following integrals is divergent?

(i) $\int_1^\infty \frac{2010}{5x^2}dx$ (ii) $\int_1^\infty \frac{1}{\sqrt{x^3}}dx$ (iii) $\int_1^\infty \frac{1+xe^{-2x}}{x}dx$

A. (iii)
B. (i)

C. (ii)
D. None of the other choices is correct

**Câu 15.** Find f(x) such that f'(x) = $x^2 - 11x + 7$ and f(0) = 3

(i) f(x) = $\left(\frac{1}{3}\right)x^3 - \left(\frac{11}{2}\right)x^2 + 6x + 1$

(ii)f(x) = $\left(\frac{1}{3}\right)x^3 - 12x^2 + 7x + 3$

(iii)f(x) = $\left(\frac{1}{3}\right)x^3 - \left(\frac{11}{2}\right)x^2 + 7x + 3$

(iv)f(x) = $\left(\frac{1}{3}\right)x^3 - 12x^2 + 7x + 1$

A. None of the other choices is correct
B. (ii)
C. (iv)
D. (iii)
E. (i)

**Câu 16.** Find y'(0) for y = $(3x^2 + 5x + 1)^{3/2}$
A. 5/2
B. 15/2
C. None of the choices is correct
D. 1/2
E. 3/2

**Câu 17.** Simplify the quotient $\frac{f(x+h)-f(x)}{h}$ for $f(x) = \frac{x^2}{2}$
A. (2x + h)/2
B. (x – 2h)/2
C. None of the other choices is correct
D. (-2x – h)/2
E. x/2

**Câu 18.** Find all the numbers that satisfy the conclusion of Rolle's Theorem

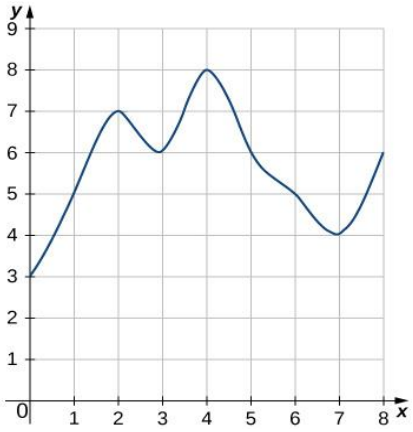
$$f(x) = x^2 - 5x + 1; \qquad [0; 5]$$

A. 5 and 2
B. None of the other choices is correct
C. 2 and 5
D. 5/2
E. 0 and 5
F. -5/2

**Câu 19.** At which points on the curve $y = 5x + 10x^3 - 3x^5$ do the tangent lines have largest slope?
A. (0, 0) and (1, 12)
B. Does not exist
C. (0, 0)

D. (-1, -12) and (1, 12)
E. (-1, -12) and (0, 0)

**Câu 20.** Given the curve of f(x) on the interval [0,8], compute the right Riemann sum $R_8$




A. 47 B. 45.5 C. 44 D. None of the other choices is correct