

Quiz #1 – Calcul

Review

Name: Corrige'

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1. Factor: $2x^3y - 16y$

/2 $2y(x^3 - 8)$

$2y(x-2)(x^2 + 2x + 4)$

2. Rationalize the numerator and simplify: $\frac{\sqrt{x+1}-2}{x-3} \cdot \frac{\sqrt{x+1} + 2}{\sqrt{x+1} + 2}$

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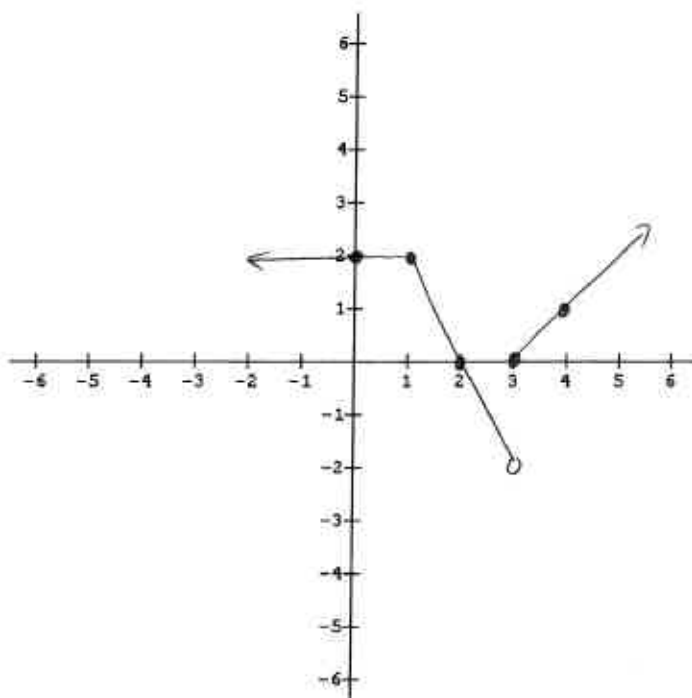
$$\frac{x+1-4}{(x-3)(\sqrt{x+1}+2)} = \frac{x-3}{(x-3)(\sqrt{x+1}+2)} = \frac{1}{\sqrt{x+1}+2}$$

3. Sketch and state the domain and range: $f(x) = \begin{cases} 2 & x \leq 1 \\ -2x + 4 & \text{if } 1 < x < 3 \\ x - 3 & x \geq 3 \end{cases}$

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D: $(-\infty, \infty)$

R: $(-2, \infty)$



4. If $f(x) = x - x^2$, find $\frac{f(x+h) - f(x)}{h}$.

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$$\frac{x+h - (x+h)^2 - (x-x^2)}{h}$$

$$\frac{x+h - (x^2 + 2xh + h^2) - x + x^2}{h}$$

$$\frac{\cancel{x} + h - \cancel{x}^2 - 2xh - h^2 - \cancel{x} + \cancel{x}^2}{h}$$

$$\frac{h - 2xh - h^2}{h}$$

$$\frac{h(1 - 2x - h)}{h}$$

$$\boxed{1 - 2x - h}$$

5. Given $f(x) = \sqrt{2x}$ and $g(x) = \sqrt{x-1}$, find $g(f(x))$ and state its domain.

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$$\boxed{g(\sqrt{2x}) = \sqrt{\sqrt{2x} - 1}}$$

Domain of $f(x) \rightarrow x \geq 0$

Domain of $g(f(x)) \rightarrow \sqrt{2x} - 1 \geq 0$
 $(\sqrt{2x})^2 \geq (1)^2$

$$2x \geq 1$$

$$x \geq \frac{1}{2}$$

Domain: $\boxed{\left[\frac{1}{2}, \infty\right)}$

6. Find the symmetry of each of the following functions (even, odd, or neither). Justify your answer.

a) $f(x) = -3x^2 + 4$

12 $f(-x) = -3(-x)^2 + 4$

$$= -3x^2 + 4$$

$$= f(x) \quad \therefore \boxed{\text{even}}$$

b) $g(x) = 2x^3 - 4x$

12 $g(-x) = 2(-x)^3 - 4(-x)$

$$= -2x^3 + 4x$$

$$= -(2x^3 - 4x)$$

$$= -g(x) \quad \therefore \boxed{\text{odd}}$$