MCR3U Unit 1 Test: Functions
February, 2026
Curriculum Expectations: F1/F2/F3

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1. **Simplify fully**, rationalizing denominators where necessary. Write the answer in the space provided. [6]

a) $\sqrt{128}$=_____ b) $-2\sqrt{6}(4\sqrt{3})$=_____ c) $2\sqrt{3}-8\sqrt{3}$=_____

d) $\frac{2\sqrt{42}}{\sqrt{6}}$=_____ e) $\frac{3}{\sqrt{6}}$=_____ f) $\sqrt[3]{54}$=_____

2. Determine the **domain** and **range** and indicate by **circling** whether the relation is a function, as indicated. [5]

$y=(x+3)^2+4$

D = _____

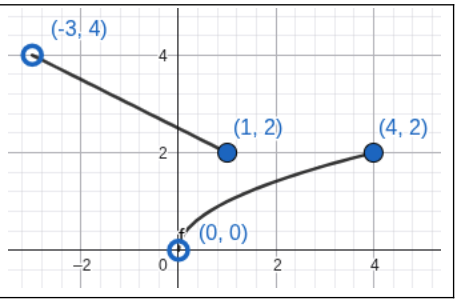
R = _____

Function/Not a function?

D = _____

R = _____

Function/Not a function?



3. Determine the **vertex** of $f(x) = -4x^2 + 24x - 41$ by **<u>completing the square</u>**. [3]
Remember to state the vertex!

4. The height of a ball thrown vertically upward from a rooftop is modeled approximately by $h(t) = -5t^2 + 20t + 60$, where $h(t)$ is the ball's height above ground, in meters, at time t seconds after the throw. Algebraically determine the domain and range of $h(t)$. Remember to consider that this is a model for real life, and the domain and range should reflect that. [4]

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5. **Simplify**. Leave all answers in simplest form, [4]

a) $(2-\sqrt{5})^2$ b) $2\sqrt{3}+3\sqrt{20}+\sqrt{75}-10\sqrt{45}$

6. Given $f(x)=-3x^2+2x$, **determine** and **simplify** where appropriate: [1,2,2]

a) $f(-3)$ b) $f(m-1)$ c) x when $f(x)=-8$

7. **Algebraically** determine the **solutions** to the following system: [4]

① $y=x^2+4x-1$

② $2x+y+4=0$

8. Determine the **minimum value** of $f(x)=\frac{1}{2}x^2-4x+9$ by **<u>partial factoring</u>** [3]

9. Determine the **factored form equation** of the quadratic that has x-intercepts of $5\pm\sqrt{3}$ and and passes through the point $(8,2)$. [3]