Inverses WS 4 Name Tfuston

Fill in the blank.

1. If (−3, 1) is on f, then $(1,-3)$ is on f^{-1}.

2. If (−3, 0) is the x-intercept of f, then $(0,-3)$ is the y-intercept of f^{-1}.

3. If $[-2,\infty)$ is the range of f, then $[-2,\infty)$ is the domain of f^{-1}.

4. If $[3,\infty)$ is the domain of f^{-1}, then $[3,\infty)$ is the range of f.

Verify that f and g are inverse functions (or not).
In order to do this you must prove that $f(g(x))=x$ and $g(f(x))=x$.

5. $f(x)=x+4;\ g(x)=x-4$

① $f(g(x))=f(x-4)=x-4+4=x$ ✓

② $g(f(x))=g(x+4)=x+4-4=x$ ✓

6. $f(x)=2x-4;\ g(x)=\frac{1}{2}x+2$

① $f(g(x))=f(\frac{1}{2}x+2)=2(\frac{1}{2}x+2)-4=x+4-4=x$ ✓

② $g(f(x))=g(2x-4)=\frac{1}{2}(2x-4)+2=x-2+2=x$ ✓

7. $f(x)=x^2+2, x\geq 0;\ g(x)=\sqrt{x-2}$

① $f(g(x))=f(\sqrt{x-2})=(\sqrt{x-2})^2+2=x-2+2=x$ ✓

② $g(f(x))=g(x^2+2)=\sqrt{x^2+2-2}=\sqrt{x^2}=x$ ✓

8. $f(x)=\frac{1}{3}x^3-2;\ g(x)=\sqrt[3]{3x+6}$

① $f(g(x))=f(\sqrt[3]{3x+6})=\frac{1}{3}(\sqrt[3]{3x+6})^3-2=\frac{1}{3}(3x+6)-2=x+2-2=x$ ✓

② $g(f(x))=g(\frac{1}{3}x^3-2)=\sqrt[3]{3(\frac{1}{3}x^3-2)+6}=\sqrt[3]{x^3-6+6}=\sqrt[3]{x^3}=x$ ✓

9. $f(x)=\frac{1}{3}x^2, x\geq 0;\ g(x)=(3x)^{\frac{1}{2}}$

① $f(g(x))=f(\sqrt{3x})=\frac{1}{3}(\sqrt{3x})^2=\frac{1}{3}(3x)=x$ ✓

② $g(f(x))=g(\frac{1}{3}x^2)=\sqrt{3(\frac{1}{3}x^2)}=\sqrt{x^2}=x$ ✓