9/16/16

pg. 126 (9-12, 13-21 odd, 27-31 odd, 34, 43, 44)

9. a.) No, doesn't pass the vertical line test
b.) Yes, it passes the horizontal line test

10. a.) Yes, it passes the vertical line test
b.) No, it doesn't pass the horizontal line test

11. a.) Yes it passes the vertical line test
b.) Yes it passes the horizontal line test

12. a.) No, it doesn't pass the vertical line test
b.) Yes it passes the horizontal line test

13. $f(x) = 3x-6$

$y = 3x-6$

$x = 3y-6$

$x+6 = 3y$

$x+6/3 = y$

$\boxed{x+6/3 = f^{-1}(x)}$

$\boxed{D: (-\infty, \infty)}$

15.) $f(x) = \frac{2x-3}{x+1}$

$y = \frac{2x-3}{x+1}$

$x = \frac{2y-3}{y+1}$

$x(y+1) = 2y-3$

$xy + x = 2y-3$

$xy + x - 2y = -3$

$xy - 2y = -3 - x$

$y(x-2) = -3-x$

$y = -3-x/x-2$

$\boxed{f^{-1}(x) = \frac{-3-x}{x-2}}$

$D: (-\infty, 2) \cup (2, \infty)$

17. $f(x) = \sqrt{x-3}$

$y = \sqrt{x-3}$

$x = \sqrt{y-3}$

$x^2 = y-3$

$x^2+3 = y$

$\boxed{x^2+3 = f^{-1}(x)}$

$\boxed{D: [0, \infty)}$

19. $f(x) = x^3 \rightarrow$ $\boxed{f^{-1}(x) = \sqrt[3]{x} \quad | \quad D: (-\infty, \infty)}$

21. $f(x) = \sqrt[3]{x+5}$

$x = \sqrt[3]{y+5}$

$x^3 = y+5$

$\boxed{x^3 - 5 = f^{-1}(x) \quad | \quad D: (-\infty, \infty)}$

27. $f(x) = 3x-2 \qquad g(x) = \frac{x+2}{3}$

$f(g(x)) = 3(\ \ ) - 2$

$= 3\left(\frac{x+2}{3}\right) - 2$

$= x+2-2$

$= x$ ✓

$g(f(x)) = \frac{(\ \ )+2}{3}$

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

$= 3x/3$

$= x$ ✓

29. $f(x) = x^3 + 1 \qquad g(x) = \sqrt[3]{x-1}$

$f(g(x)) = (\ \ )^3 + 1$

$= \left(\sqrt[3]{x-1}\right)^3 + 1$

$= x-1+1$

$= x$ ✓

$g(f(x)) = \sqrt[3]{(\ \ )-1}$

$= \sqrt[3]{(x^3+1)-1}$

$= \sqrt[3]{x^3}$

$= x$ ✓

31. $f(x) = \frac{x+1}{x} \qquad g(x) = \frac{1}{x-1}$

$f(g(x)) = \frac{(\ \ )+1}{(\ \ )}$

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

$= \left(\frac{1}{x-1}+1\right) \div \left(\frac{1}{x-1}\right)$

$= \left(\frac{1+x-1}{x-1}\right) \div \left(\frac{1}{x-1}\right)$

$= \left(\frac{x}{x-1}\right) \cdot \left(\frac{x-1}{1}\right)$

$= \frac{x}{1} = x$ ✓

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

$= 1/\left(\frac{x+1}{x}\right) - 1$

$= 1 \div \left(\frac{x+1}{x} - 1\right)$

$= 1 \div \left(\frac{x+1}{x} - \frac{x}{x}\right)$

$= 1 \div \left(\frac{x+1-x}{x}\right)$

$= 1 \div \left(\frac{1}{x}\right)$

$= 1 \cdot \left(\frac{x}{1}\right) = x$ ✓

34. a) $C(x) = (5/9)(x - 32)$

$x = (5/9)(y - 32)$

$(9/5)x = y - 32$

$\boxed{(9/5)x + 32 = C^{-1}(x) \rightarrow \text{used to convert } C^\circ \text{ to } F^\circ}$

43. C

44. A