(11) $f(x) = \frac{1}{5}x + 7$

$y = \frac{1}{5}x + 7$ (Replace $f(x)$ with y)

$x = \frac{1}{5}y + 7$ (Interchange x and y)

$x - 7 = \frac{1}{5}y$

$5(x-7) = y$

$5x - 35 = y$

$y = 5x - 35 \rightarrow \boxed{f^{-1}(x) = 5x - 35}$

Answer: D.

(12) Do $f(g(x))$; $f(h(x))$; $g(h(x))$, we see that :

$g(h(x)) = \cancel{2}\left(\frac{x+8}{\cancel{2}}\right) - 8 = x + \cancel{8} - \cancel{8}$

$= x$.

The other two do not simplify to x.

So, $g(x)$ and $h(x)$ are inverses of one another.

Answer: A .

Short Answer:

(13) $y = |x| \xrightarrow[\text{by } 3.9]{\text{vertically Stretch}} 3.9|x|$

(original)

$\downarrow$ Reflected across x-axis

$-3.9|x| - 0.59 \xleftarrow{0.59 \text{ down}} -3.9|x|$

So, final formula: $\boxed{y = -3.9|x| - 0.59}$ ← answer.

(14) $\boxed{y = f(x)}$ original $\qquad \boxed{y = f(x+1)}$ transformed

Left 1

x	$y = f(x)$
7	18

$\rightarrow (7, 18) \xrightarrow{\text{left } 1} (6, 18)$

original

Subtract x-coord. by 1

Answer: $\boxed{(6, 18)}$

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

This has square root in denominator.

To find domain : Set $x - 3 > 0$

$x > 3$

In interval notation: $D = \boxed{(3, \infty)}$

(16) $f(x) = \dfrac{x-5}{2}$; $g(x) = 7x + 2$

$(g \circ f)(15)$

Plug 15 into f, simplify, then plug result into g.

$$f(15) = \frac{(15)-5}{2} = 5$$

$$g(5) = 7(5)+2 = 37$$

Answer: $\boxed{37}$

Essay

17 $f(x) = 4x^2 + 3x + 5$; $g(x) = 3x - 3$

$$(g \circ f)(x) = g(f(x)) = g(4x^2+3x+5)$$
$$= 3(4x^2+3x+5) - 3$$
$$= 12x^2 + 9x + 15 - 3$$

$$\boxed{(g \circ f)(x) = 12x^2 + 9x + 12}$$

18 $f(x) = \dfrac{5}{7x-1}$. Find inverse

$$y = \frac{5}{7x-1} \quad \text{(Replace } f(x) \text{ with } y)$$

$$x = \frac{5}{7y-1} \quad \text{(interchange } x \text{ and } y)$$

$$x(7y-1) = \left(\frac{5}{\cancel{7y-1}}\right)(\cancel{7y-1}) \quad \text{(Multiply both sides by } 7y-1)$$

$$x(7y-1) = 5$$

$$7y - 1 = \frac{5}{x} \quad \text{(Divide both sides by } x)$$

$$7y = \frac{5}{x} + 1 \quad (\text{Add } 1)$$

$$y = \frac{\frac{5}{x} + 1}{7} \quad (\text{Divide by } 7)$$

$$\boxed{f^{-1}(x) = \frac{\frac{5}{x} + 1}{7}} \quad (\text{Replace } y \text{ by } f^{-1}(x))$$

(You can leave the answer like this or simplify as follows:

$$f^{-1}(x) = \frac{\frac{5}{x} + \frac{1 \cdot x}{1 \cdot x}}{7} = \frac{\frac{5+x}{x}}{\frac{7}{1}}$$

$$= \frac{5+x}{x} \cdot \frac{1}{7} = \frac{5+x}{7x}$$)