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5) f 6) c 7) e 8) b 9) a 10) d

22) reflected over the x-axis and over the y-axis, up 2

23) Vertical compression of $\frac{1}{4}$

39) reflected over the y-axis, right 1

40) Horizontal compression of 2, up 1

65) b) 63% c) 57.56 days

66) b) $V(1) = \$58.69$ $V(4) = \$77.29$ $V(12) = \$78.00$

$V(2) = \$71.57$ $V(6) = \$77.92$

c) 2.69 months

For 1-4: Find the inverse. State the domain and range for the function and its inverse.

1. $f(x) = \frac{x+5}{3-x}$

① VA Domain $f(x) \neq 3$ $(-\infty, 3) \cup (3, \infty)$

HA Range $f(x) \neq -1$ $(-\infty, -1) \cup (-1, \infty)$

② $x = \frac{y+5}{3-y}$

③ $3x - xy = y + 5$

④ $3x - 5 = y + xy$

⑤ $3x - 5 = y(1+x)$

⑥ $\frac{3x-5}{1+x} = y$

Range $f^{-1}(x) \neq -1$ $(-\infty, -1) \cup (-1, \infty)$

⑦ $f^{-1}(x) = \frac{3x-5}{1+x}$

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2. $\frac{2y}{x} = \frac{2x+1}{x-4}$

VA ① Domain $f(x) \neq 4$ $(-\infty, 4) \cup (4, \infty)$

HA Range $f(x) \neq 2$ $(-\infty, 2) \cup (2, \infty)$

② $xy - 4x = 2y + 1$

$xy - 2y = 4x + 1$

$y(x-2) = 4x + 1$

$y = \frac{4x+1}{x-2}$

③ $f^{-1}(x) = \frac{4x+1}{x-2}$

3. $\frac{2y}{x} = \sqrt{x-4}$

① Domain $f(x) \geq 4$ $[4, \infty)$

Range $f(x) \geq 0$ $[0, \infty)$

② $x = \sqrt{y-4}$

③ $x^2 = y-4$

$x^2 + 4 = y$

④ $f^{-1}(x) = x^2 + 4$

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4. $\frac{2y}{x} = x^2 - 4x, x > 2$
(Hint: Notes U4D1 #4)

① Domain $f(x) > 2$ $(2, \infty)$

Range $f(x) > -4$ $(-4, \infty)$

② $x = y^2 - 4y$

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

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

$\pm \sqrt{x+4} = y-2$

$\pm \sqrt{x+4} + 2 = y$

③ $f^{-1}(x) = \sqrt{x+4} + 2$

$\left(\frac{1}{2}\right)^0 = 1 \quad \left(\frac{1}{2}\right)^{-3} = 8 \quad \left(\frac{2}{1}\right)^3 = 8$

5. Graph the function and its inverse. Make a table of values. $f(x) = \left(\frac{1}{2}\right)^x$

$f(x)$	x	-3	-2	-1	0	1	2	3
$f(x)$	y	8	4	2	1	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$

$f^{-1}(x)$	x	8	4	2	1	$\frac{1}{2}$	$\frac{1}{4}$	$\frac{1}{8}$
$f^{-1}(x)$	y	-3	-2	-1	0	1	2	3

Domain $f(x) = (-\infty, \infty)$ $x \in \mathbb{R}$

Range $f(x) = (0, \infty)$ $y > 0$

Domain $f^{-1}(x) = (0, \infty)$ $x > 0$

Range $f^{-1}(x) = (-\infty, \infty)$ $y \in \mathbb{R}$

$y = 5^x$

$f(x)$

$f^{-1}(x)$

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6 - 8. Describe the transformation(s) needed to transform $f(x) = 3^x$ into the graph of the given function.

$$\downarrow > 1 \times 2$$

6. $g(x) = 2(3^{x+1}) - 5$
Vertical stretch 2
left 1
down 5

7. $h(x) = -3^x + 4$
x-axis
up 4

8. $j(x) = 3^{-x} + 7$
y-axis
up 7

9 - 11. Write in exponential form

9. $\log_2 8 = 3$
 $2^3 = 8$

10. $\log_A B = J$
 $A^J = B$

11. $\log 5 = x$
 $10^x = 5$

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12 - 13. Write in logarithmic form

12. $3^4 = 81$
 $\log_3 81 = 4$

13. $K^A = M$
 $\log_K M = A$

14. $2^{-4} = \frac{1}{16}$
 $\log_2 \frac{1}{16} = -4$

15 - 17. Evaluate.

15. $\log_{16} 4 = \frac{1}{3}$
 $4^{\frac{x}{3}} = 4^1$

16. $\log_2 64 = 6$
 $2^x = 64$

17. $\log_3 \frac{1}{3} = -\frac{1}{2}$
 $3^{2x} = 3^{-1}$

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