HW8
HPC A

Name key

Unit 1 TEST REVIEW

Give the domain and range of the relation. State whether it's a function.

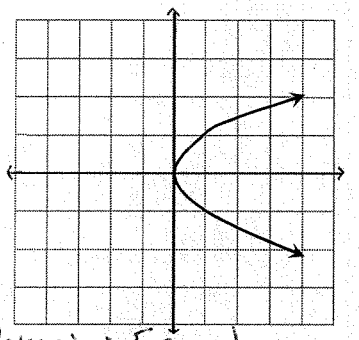
1) {(–6, 8), (–3, 8), (2, –7), (2, –9)}

Domain: $\{-6, -3, 2\}$
Range: $\{8, -7, -9\}$
Not a Function

3) {(–3, –5), (–1, 5), (2, –4), (7, –8)}

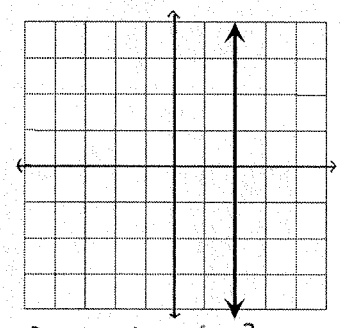
Domain: $\{-3, -1, 2, 7\}$
Range: $\{-5, 5, -4, -8\}$
Function

3)



Domain: $[0, \infty)$
Range: $(-\infty, \infty)$
Not a Function

4)



Domain: $\{2\}$
Range: $(-\infty, \infty)$
Not a Function

Evaluate the function at the given value of the independent variable and simplify.

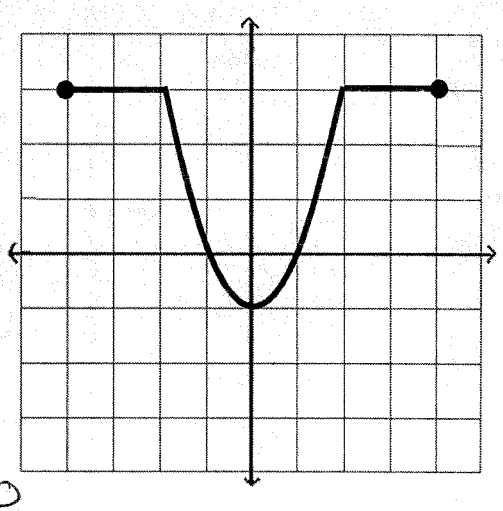
5) $f(x) = 5x^2 + 2x + 3;\ f(x-1)$

$f(x-1) = 5x^2 - 8x + 6$

6) $f(x) = 5x^2 + 2x + 3;\ f(-4m)$

$f(-4m) = 80m^2 - 8m + 3$

Use the following graph to the right to answer the questions.



7) Domain: $[-4, 4]$

8) Range: $[-1, 3]$

9) *x*-intercepts: $-1, 1$

10) *y*-intercepts: -1

11) Interval(s) on which *f (x)* is increasing: $(0, 2)$

12) Interval(s) on which *f(x)* is decreasing: $(-2, 0)$

13) Interval(s) on which *f(x)* is constant: $(-4, -2) \cup (2, 4)$

14) What are the relative minimums of *f(x)*? -1

15) At what numbers does *f(x)* have a relative minimum? 0

16) *f*(2) = 3

17) Is *f* even, odd, or neither? even

Evaluate without a calculator.

18) $\log_8(\log_{81} 9)$

$-\frac{1}{3}$

19) $\log_{27}(\log 1000)$

$\frac{1}{3}$

Expand.

20) $\log_a\left(\frac{x^4\sqrt[3]{x+5}}{(x-2)^2}\right)$

$4\log_a x + \frac{1}{3}\log_a(x+5) - 2\log_a(x-2)$

21) $\log\left[\frac{2x^4\sqrt[5]{3-x}}{6(x+3)^2}\right]$

$\log 2 + 4\log x + \frac{1}{2}\log(3-x) - \log 6 - 2\log(x$

Condense.

22) $\frac{1}{5}\left[4\ln(x+5) - \ln x - \ln(x^2-8)\right]$

$\ln\sqrt[5]{\frac{(x+5)^4}{x(x^2-8)}}$

23) $\log x + \log(x^2-100) - \log 3 - \log(x-10)$

$\log\frac{x(x+10)}{3}$

Solve. Leave the exact answer.

24) $e^{2x-8} - 10 = 1215$

$\frac{\ln 1225 + 8}{2}$

25) $4^{x+4} = 5^{2x+5}$

$\frac{4\ln 4 - 5\ln 5}{2\ln 5 - \ln 4}$

26) $\log_4(x+4) - \log_4(x-2) = 3$

$\frac{44}{21}$

27) $\log_2(x+1) + \log_2(x-5) = 4$

7

Given functions f and g, perform the indicated operations and find the domain of the resulting function.

28) $f(x)=7x-5, \quad g(x)=2x-4$

Find f – g.

$5x-1$ D: $(-\infty,\infty)$

29) $f(x)=5x^2-7x, \quad g(x)=x^2-2x-35$

Find $\frac{f}{g}$.

$\frac{x(5x-7)}{(x-7)(x+5)}$ D: $(-\infty,-5)\cup(-5,7)\cup(7,\infty)$

Given functions f and g, perform the indicated operations and find the domain of the resulting function.

30) $f(x)=3x+5, \quad g(x)=6x-6$

Find fg.

$18x^2+12x-30$

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

31) $f(x)=\sqrt{4x+3}, \quad g(x)=\sqrt{4x-16}$

Find fg.

$\sqrt{16x^2-52x-48}$

D: $(-\infty,-\frac{3}{4}]\cup[4,\infty)$

32) $f(x)=\frac{3x}{x-1}, \quad g(x)=\frac{5}{x+9}$

Find f + g.

$\frac{3x^2+32x-5}{(x-1)(x+9)}$

D: $(-\infty,-9)\cup(-9,1)\cup(1,\infty)$

33) $f(x)=\frac{7}{x+1}, \quad g(x)=\frac{4}{5x}$

Find $f\circ g$.

$\frac{35x}{4+5x}$

D: $(-\infty,-\frac{4}{5})\cup(-\frac{4}{5},\infty)$

34) $f(x)=x+1, \quad g(x)=\frac{4}{x+6}$

Find $g\circ f$.

$\frac{4}{x+7}$

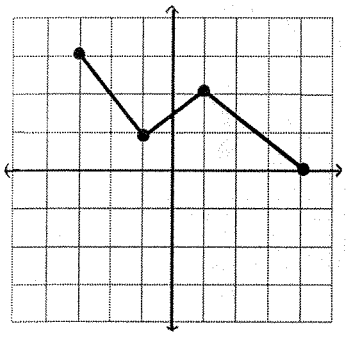
D: $(-\infty,-7)\cup(-7,\infty)$

35) $f(x)=\sqrt{x}, \quad g(x)=3x+15$

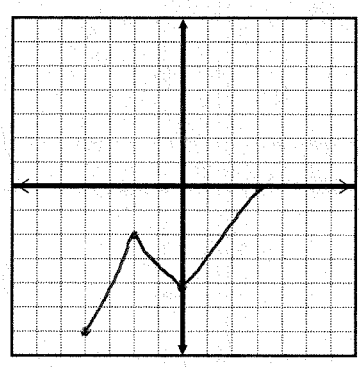
Find $(f\circ g)(-3)$.

$\sqrt{6}$

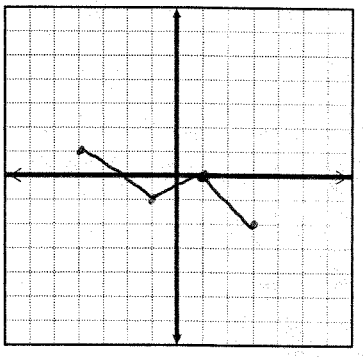
Use the following graph to graph each transformation.



36) $g(x) = -2f(x+1)$

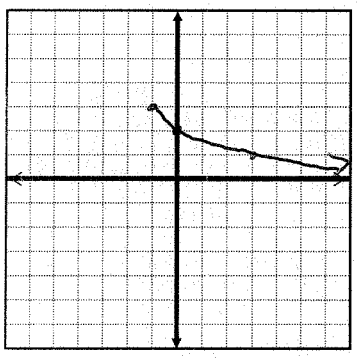


37) $h(x) = -f(-x)+1$

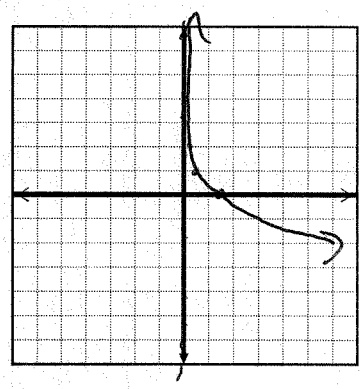


Graph the following functions.

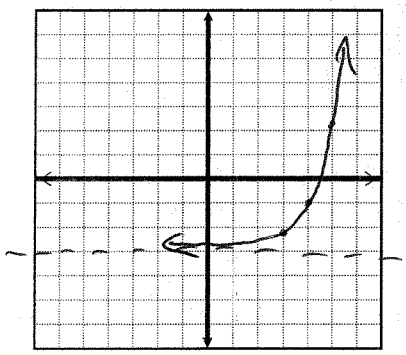
38) $f(x) = 3 - \sqrt[3]{x+1}$



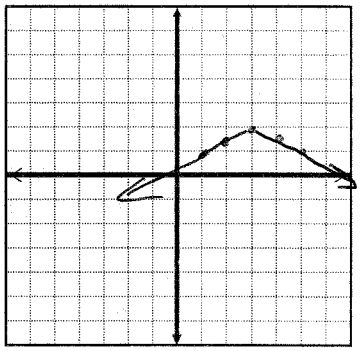
39) $f(x) = -\log_3(2x)+1$



40) $f(x) = 2e^{(x-4)} - 3$



41) $f(x) = -\frac{1}{2}|x-3|+2$



Determine if the two functions are inverses of each other.

42) $f(x)=\frac{x-3}{2}$, $h(x)=\frac{x+3}{2}$

$(f\circ g)(x)\neq(g\circ f)(x)\neq x$

Not Inverses

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

$(f\circ g)(x)=(g\circ f)(x)=x$

Inverses

Find the inverse of each function.

44) $f(x)=\frac{2x-5}{7}$

$f^{-1}(x)=\frac{7}{2}x+\frac{5}{2}$

45) $f(x)=(x+3)^3$

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

46) $f(x)=\sqrt{x+4}$

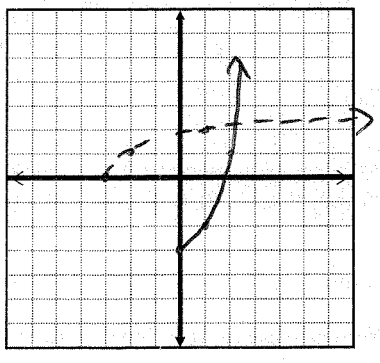
$f^{-1}(x)=x^2-4 \quad x\geq 0$

47) $f(x)=\frac{3}{8x-5}$

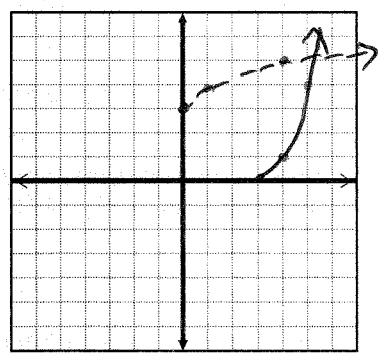
$f^{-1}(x)=\frac{5x+3}{8x}$

Graph f as a solid line and f^{-1} as a dashed line in the same rectangular coordinate plane. Find an equation for f^{-1}. Use interval notation to give the domain and range of f and f^{-1}.

48) $f(x)=x^2-3,\ x\geq 0$



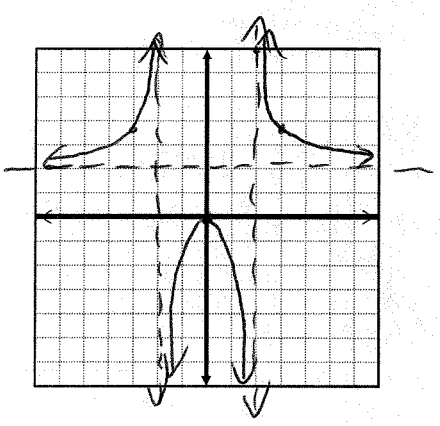
49) $f(x)=(x-3)^2,\ x\geq 3$



Graph the following functions. State the a) symmetry, b) y-intercept, c) x-intercept(s), d) vertical asymptote(s), e) horizontal or slant asymptote, f) hole (if any)

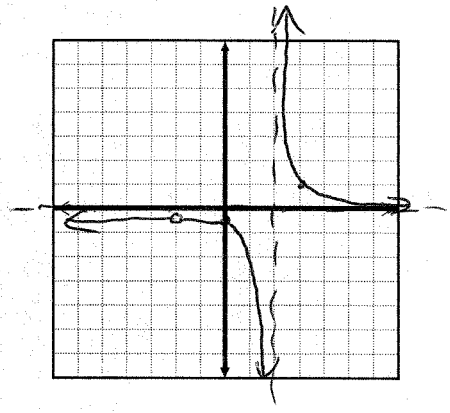
50) $f(x)=\frac{2x^2}{x^2-4}$

a) even
b) 0
c) 0 (Bounces)
d) $x=\pm 2$
e) $y=2$
f) none



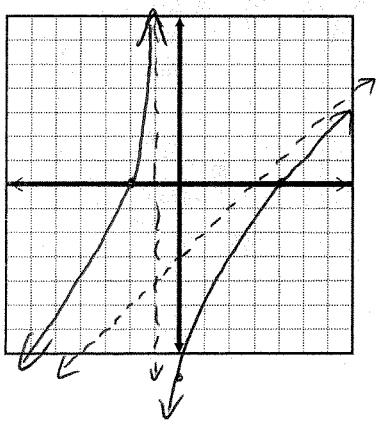
51) $f(x)=\frac{x+2}{x^2-4}=\frac{1}{x-2}$

a) none
b) $-\frac{1}{2}$
c) none
d) $x=2$
e) $y=0$
f) $(-2,-\frac{1}{4})$



52) $f(x)=\frac{x^2-2x-8}{x+1}$

a) none
b) -8
c) $4,-2$
d) $x=-1$
e) $y=x-3$
f) none



53) $f(x)=\frac{x+4}{x^2-2x+1}$

a) none
b) 4
c) -4
d) $x=1$
e) $y=0$
f) none