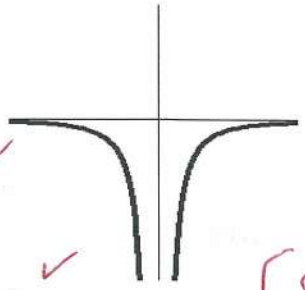
40/40

Name Answers quiz - power functions - transformations 2011

1) Complete the following for the power function given:



a) Domain: $x \neq 0$ ✓ Range: $y < 0$ ✓

b) End Behavior: as $x \to \infty, y \to$ 0 ✓ $x \to -\infty, y \to$ 0 ✓

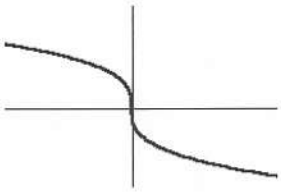
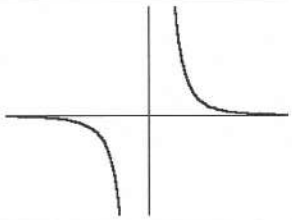
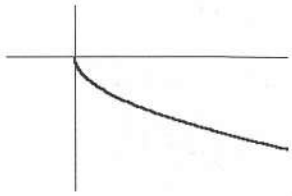
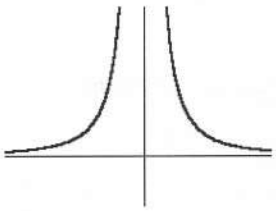
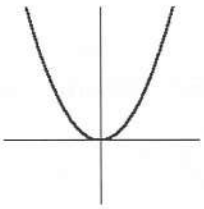
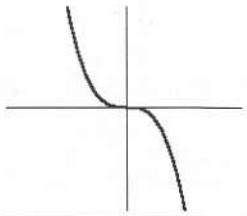
For what values of x is the function:

c) Concave up: — ✓ Concave Down: whole domain ✓

d) Increasing: $x > 0$ ✓ Decreasing: $x < 0$ ✓

[8]

2) Refer to the sketches below to answer questions a – f

1 	2 	3 
4 	5 	6 

a. Write a possible equation for power functions: 1) $y = -x^{1/3}$ ✓ 2) $y = x^{-3}$ ✓

b. Which function(s) are concave up for **x>0**, and concave down for **x<0**? 1, 2 ✓ ∩ ∪

c. Which function(s) are concave up for their entire domain? 3, 4, 5 ✓ ✓

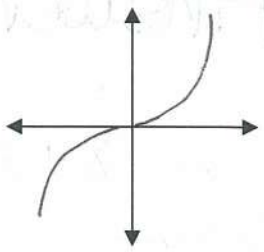
d. Which function(s) are decreasing for their entire domain? 1, 2, 3, 6 ✓ ✓

e. Which function(s) have a domain of all reals? 1, 5, 6 ✓ ✓

f. Describe the end behavior of function 1: $x \to \infty, y \to -\infty$ ✓ $x \to -\infty, y \to \infty$ ✓

3) Sketch a power function with the following characteristics:

- End behavior: as $x \to \infty$, $y \to \infty$
  as $x \to -\infty$, $y \to -\infty$
- Concave Down: $x < 0$, Concave Up: $x > 0$



4) Given $f(x)$ is a power function and given $f(27) = -9$ and $f(64) = -12$, write the equation of $f(x)$. **(You must show algebraic work to get full credit for this problem.)** (27, -9) (64, -12)

$-9 = K(27)^p \rightarrow K = \frac{-9}{27^p}$

$-12 = K(64)^p \rightarrow K = \frac{-12}{64^p}$

$\frac{-9}{27^p} = \frac{-12}{64^p}$

$-9 \cdot 64^p = -12 \cdot 27^p$

$\frac{-9}{-12} = \left(\frac{27}{64}\right)^p$

$\frac{3}{4} = \left(\frac{27}{64}\right)^p$

$p = \frac{1}{3}$ $K = -3$

$y = -3x^{\frac{1}{3}}$

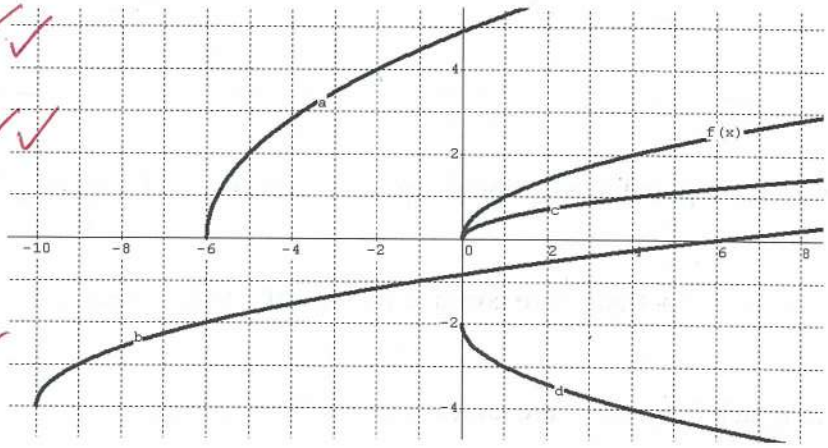
5) Given the power function $f(x) = x^{1/2}$ below, determine the explicit equations of functions:

a) $y = 2(x+6)^{1/2}$

b) $y = (x+10)^{1/2} - 4$

c) $y = \frac{1}{2}x^{1/2}$

d) $y = -x^{1/2} - 2$

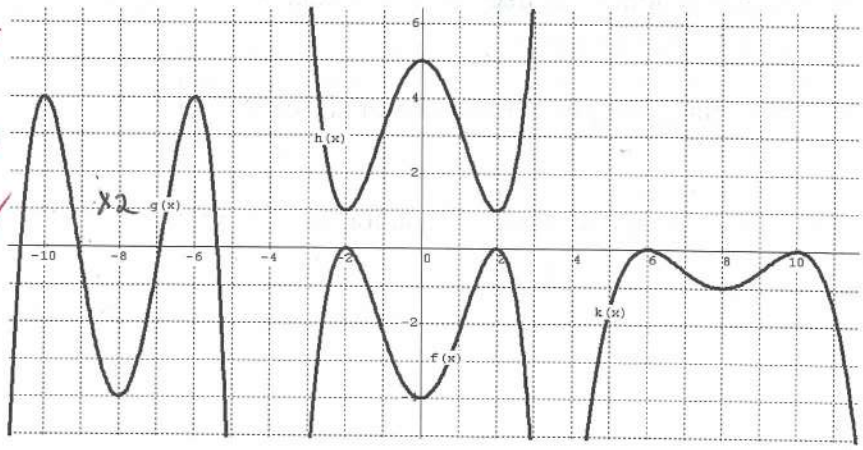


6) The function f(x) is drawn below. Find the equations of the other functions shown in terms of f(x).

g(x)= $2f(x+8)+4$

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

k(x)= $\frac{1}{4}f(x-8)$



Bonus:

a) $x \neq -\frac{1}{2}, x \neq \frac{5}{3}$ b) $x \geq 4$