Name: ________________________________ Date: ______________________________

2.5 Stretches of Functions

BLM 2–7

1. For each function $g(x)$, describe how the graph can be obtained from the graph of $f(x)$.

a) $g(x) = \frac{1}{2}f(x)$ **b)** $g(x) = f\left(\frac{3}{4}x\right)$

c) $g(x) = 4f(x)$ **d)** $g(x) = f(2x)$

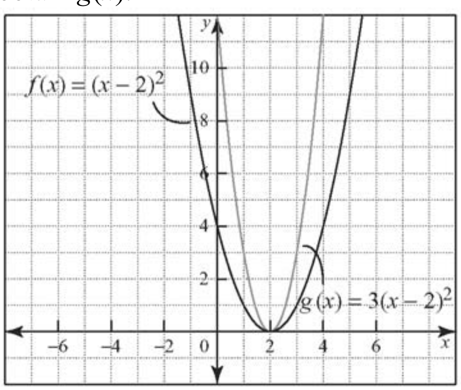
2. For each function, describe the transformation from the base function $f(x) = x^2$ in two ways.

a) $g(x) = 16x^2$ **b)** $g(x) = \left(\frac{1}{2}x\right)^2$

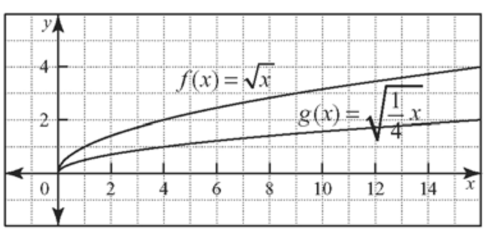
3. Graph both $f(x)$ and $g(x)$ for each part of question 2 on the same axes.

4. Compare the graphs of $f(x)$ and $g(x)$. Describe the transformation the needs to be applied to $f(x)$ to obtain $g(x)$.

a)



b)



5. A ball dropped from 10 m falls according to the equation $h(t) = -\frac{1}{2}at^2 + 10$, where h represents the height in metres and a represents the acceleration due to gravity, which on Earth is 9.8 m/s^2. The acceleration due to gravity on the moon is approximately $\frac{1}{6}$ that on Earth.

a) Substitute the acceleration due to gravity on Earth into the height equation and simplify.

b) Transform the height equation on Earth to write the height equation on the moon.

c) Use the equations to determine the difference in time needed for the ball to reach the ground on Earth and on the moon.

6. The energy associated with the motion of a metal spring is given by $E = \frac{1}{2}kx^2$, where E is the energy in joules, x is the distance the spring is displaced in metres, and k is the spring constant. The spring constant relates to the gauge of metal used and how tightly the spring is wound.

a) Explain the role of k in this equation.

b) Determine the energy equation for a spring with a spring constant of 800.

c) Graph the energy equation using energy on the y-axis and displacement on the x-axis. Explain the meaning of a negative x-value and a positive x-value for this situation.

d) Determine the amount of energy stored by a spring with a spring constant of 800 by each displacement.

i) 25 cm

ii) 30 cm

iii) 40 cm

e) Another spring has a constant of 200. Without determining the new energy equation, apply the compression factor due to the new spring to determine the amount of energy stored in the new spring under the displacements in part d).

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