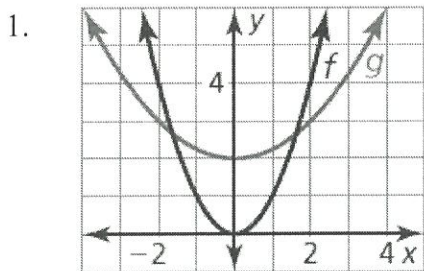


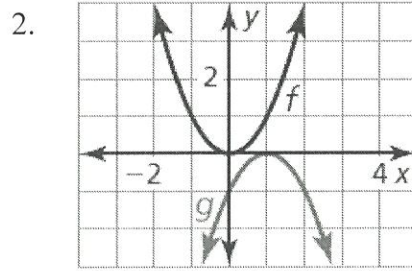
#1-4: Describe the transformation(s) of $f(x) = x^2$ represented by g.



VERTICAL SHRINK BY A FACTOR OF $\frac{1}{4}$ (OR HORIZ. STRETCH BY A FACTOR OF 2), SHIFT 2 UNITS UP.

3. $g(x) = (2x)^2 - 5$

HORIZ. SHRINK BY A FACTOR OF $\frac{1}{2}$, SHIFT 5 UNITS DOWN.



REFLECTION ACROSS X-AXIS, SHIFT 1 UNIT RIGHT.

4. $g(x) = -3(x+1)^2$

REFLECTION ACROSS X-AXIS, VERTICAL STRETCH BY A FACTOR OF 3, SHIFT 1 UNIT LEFT.

#5-7: Write a rule for g and identify the vertex.

5. Let g be a translation 2 units up followed by a reflection in the x-axis and a vertical stretch by a factor of 6 of the graph of $f(x) = x^2 + 1$.

$h(x) = f(x) + 2$

$g(x) = -6h(x)$

$h(x) = x^2 + 1 + 2 = x^2 + 3$

$g(x) = -6(x^2 + 3) = -6x^2 - 18$

$g(x) = -6x^2 - 18$
V: (0, -18)

6. Let g be a translation 1 unit left and 6 units down, followed by a vertical shrink by a factor of $\frac{1}{2}$ of the graph of $f(x) = 4(x+2)^2$.

$h(x) = f(x+1) - 6$

$g(x) = \frac{1}{2}h(x)$

$h(x) = 4(x+1+2)^2 - 6 = 4(x+3)^2 - 6$

$g(x) = \frac{1}{2}(4(x+3)^2 - 6) = 2(x+3)^2 - 3$

$g(x) = 2(x+3)^2 - 3$
V: (-3, -3)

7. Let g be a horizontal stretch by a factor of 3 followed by a translation 5 units up of the graph of $f(x) = x^2 - 4$.

$h(x) = f(\frac{1}{3}x)$

$g(x) = h(x) + 5$

$h(x) = (\frac{1}{3}x)^2 - 4 = \frac{1}{9}x^2 - 4$

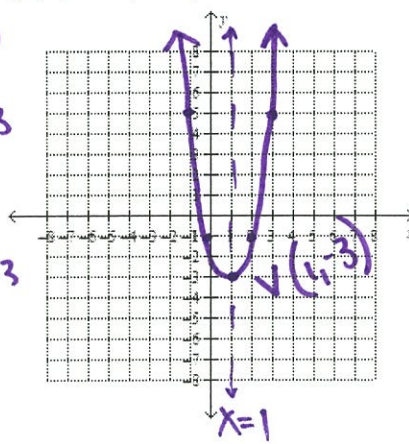
$g(x) = \frac{1}{9}x^2 - 4 + 5 = \frac{1}{9}x^2 + 1$

$g(x) = \frac{1}{9}x^2 + 1$
V: (0, 1)

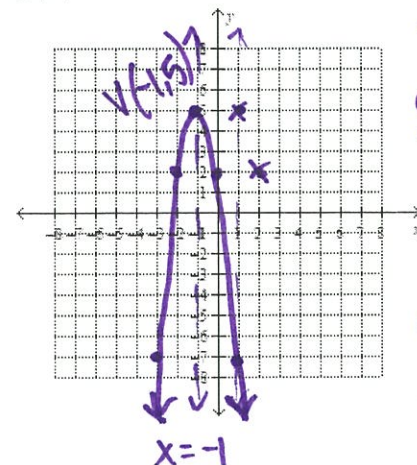
#8-9: Graph the function. Label the vertex and axis of symmetry.

8. $f(x) = 2(x-1)^2 - 3$

V: (1, -3)
 $f(1) = 2(1)^2 - 3$
 $f(1) = -1$
 $f(-1) = 2(-2)^2 - 3$
 $f(-1) = 5$



9. $g(x) = -3x^2 - 6x + 2$



$x = \frac{-b}{2a} = \frac{-(-6)}{2(-3)} = -1$
 $g(-1) = -3(-1)^2 - 6(-1) + 2$
 $g(-1) = 5$
V: (-1, 5)
 $g(1) = -3(1)^2 - 6(1) + 2$
 $g(1) = -7$

#10-11: Identify the x-intercept(s) and vertex of the graph of the function.

10. $g(x) = -3(x+2)(x+4)$

X-INTS: $(-2,0)(-4,0)$
 V: $(-3,3)$

$\frac{p+q}{2} = \frac{-2-4}{2} = -3$

$g(-3) = -3(-3+2)(-3+4) = -3(-1)(1) = 3$

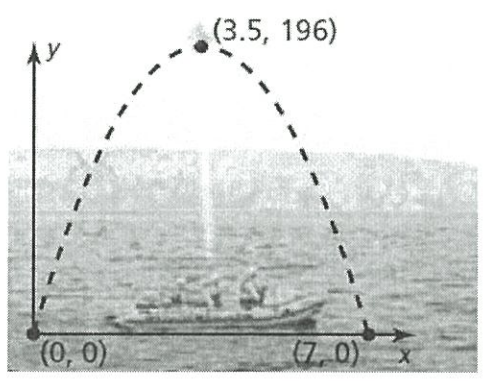
11. $f(x) = 0.4x(x-6)$

X-INTS: $(0,0)(6,0)$
 V: $(3,-3.6)$

$\frac{p+q}{2} = \frac{0+6}{2} = 3$

$f(3) = 0.4(3)(3-6) = -3.6$

12. A passenger on a stranded lifeboat shoots a flare into the air. The height (in feet) of the flare above the water is given by $h(t) = -16t(t-8)$, where t is the time (in seconds) since the flare was shot. The passenger shoots a second flare, whose path is modeled in the graph below. Which flare travels higher? By how much? Justify your answer.



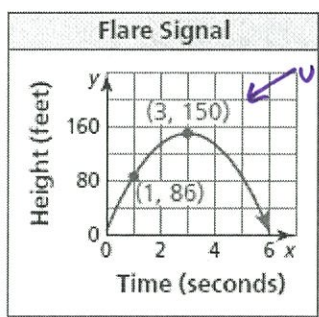
$\frac{p+q}{2} = \frac{0+8}{2} = 4$
 $h(4) = -16(4)(4-8) = 256$

$\frac{256}{-196} = 60 \text{ FEET}$

THE FIRST FLARE TRAVELS HIGHER BY 60 FEET.

#13-14: Write the equation of the parabola in vertex or intercept form.

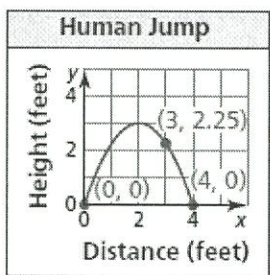
13.



$y = -16(x-3)^2 + 150$

$y = a(x-h)^2 + k$
 $86 = a(1-3)^2 + 150$
 $-64 = a(-2)^2$
 $-64 = \frac{4a}{4}$
 $a = -16$

14.



$y = -0.75(x)(x-4)$

$y = a(x-p)(x-q)$
 $2.25 = a(3-0)(3-4)$
 $2.25 = a(3)(-1)$
 $\frac{2.25}{-3} = \frac{-3a}{-3}$
 $a = -0.75$