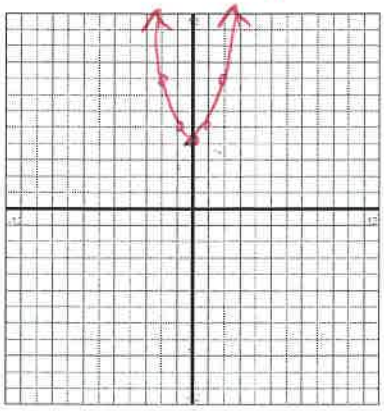
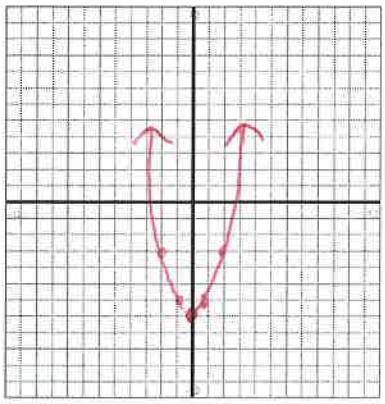
Quiz 2.1-2.2 A Review

Describe the transformations of $f(x) = x^2$ represented by g. Then graph each function.

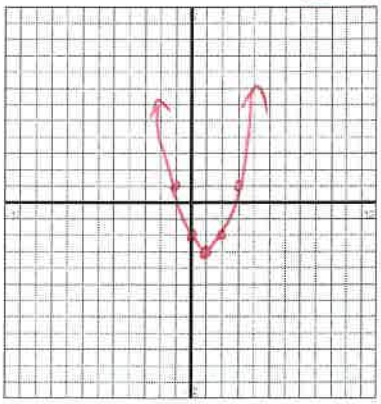
1. $g(x) = x^2 + 4$ Up 4



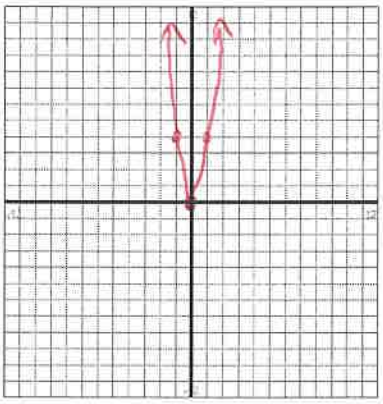
2. $g(x) = x^2 - 7$ down 7



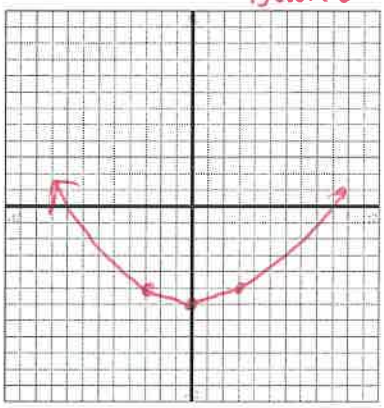
3. $g(x) = (x-1)^2 - 3$ Right 1 Down 3



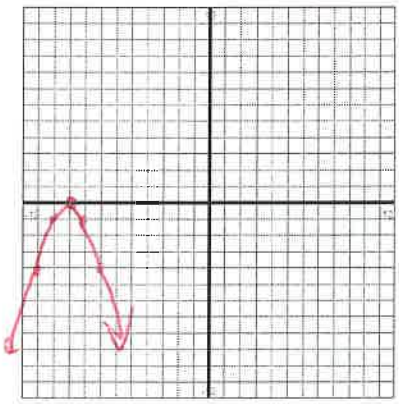
4. $g(x) = 4x^2$ V. Stretch 4



5. $g(x) = \frac{1}{3}x^2 - 6$ V. Shrink $\frac{1}{3}$ Down 6



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



Write a rule for g described by the transformations of the graph of f. Then identify the vertex.

7. $f(x) = x^2$; vertical stretch by a factor of 5 and a reflections in the x-axis, followed by a translation 3 units down.

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

8. $f(x) = x^2$; vertical shrink by a factor of $\frac{1}{2}$ followed by a translation 4 units left.

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

9. $f(x) = 9x^2 - 3$; vertical shrink by a factor of $\frac{1}{3}$ followed by a translation of 4 units up.

$f(x) = 9x^2 - 3$
$g(x) = 3x^2 - 1$
$g(x) = 3x^2 + 3$

10. $f(x) = (x-12)^2 + 1$; translation 8 units left followed by a reflection across the x-axis.

$f(x) = (x-12)^2 + 1$
$g(x) = (x-4)^2 + 1$
$g(x) = -(x-4)^2 - 1$

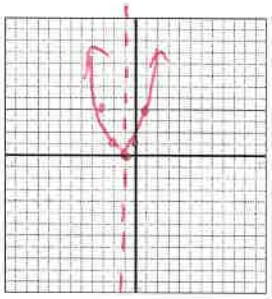
Graph the function. Label the vertex and the axis of symmetry.

$x = \frac{-b}{2a} = \frac{3}{3} = 1$

11. $f(x) = (x+1)^2$

Vertex: (-1, 0)

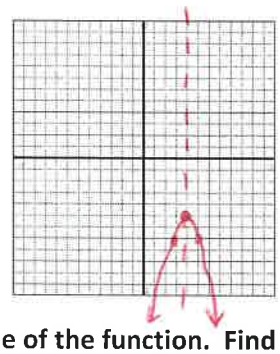
Axis of Symmetry: $x = -1$



12. $y = -2(x-4)^2 - 5$

Vertex: (4, -5)

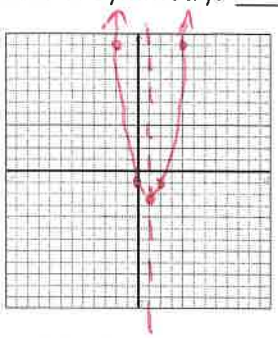
Axis of Symmetry: $x = 4$



13. $g(x) = \frac{3}{2}x^2 - 3x - 1$

Vertex: $(1, -\frac{5}{2})$

Axis of Symmetry: $x = 1$



Find the minimum value or maximum value of the function. Find the domain and range of the function, and when the function is increasing and decreasing.

14. $y = -4x^2 + 8x + 3$

$x = \frac{-b}{2a} = \frac{-8}{-8} = 1$ (1, 7)

Max = 7 D: $\mathbb{R}$ R: $y \leq 7$

inc: $x < 1$ dec: $x > 1$

15. $k(x) = 5x^2 + 20x$

$x = \frac{-b}{2a} = \frac{-20}{10} = -2$ (-2, -20)

Min = -20 D: $\mathbb{R}$ R: $y \geq -20$

dec: $x < -2$ inc: $x > -2$

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

$x = \frac{-b}{2a} = \frac{4}{1} = 4$ (4, -5)

Min = -5 D: $\mathbb{R}$ R: $y \geq -5$

dec: $x < 4$ inc: $x > 4$

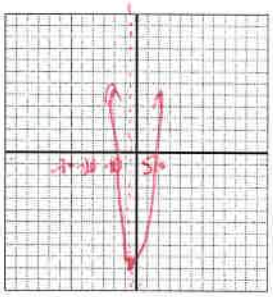
Graph the function. Label the x-intercept(s), vertex and axis of symmetry.

17. $f(x) = 4(x+4)(x-3)$

x-intercept(s): (-4, 0) (3, 0)

Vertex: $(-\frac{1}{2}, -49)$

Axis of Symmetry: $x = -\frac{1}{2}$

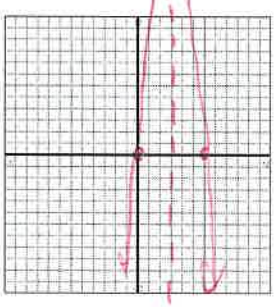


18. $f(x) = -7x(x-6)$

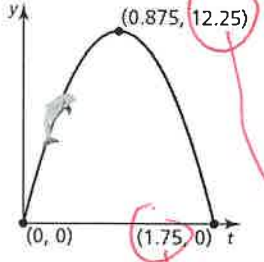
x-intercept(s): (0, 0) (6, 0)

Vertex: (3, 63)

Axis of Symmetry: $x = 3$



19. The height (in feet) of a dolphin above the water is given by $f(t) = -16t(t - 1.5)$, where t is the time (in seconds) since the dolphin jumped out of the water. The graph shows the path of the second dolphin that jumps out of the water. Which dolphin jumps higher? Which dolphin remains in the air longer?



First: $f(t) = -16t(t - 1.5)$

$y = -16t^2 + 24t$

$x = \frac{-b}{2a} = \frac{-24}{-32} = \frac{3}{4}$

(0.75, 9) double

H: 9, L: 1.50

Second: H: 12.25, L: 1.75

Second is Higher and Longer