HOMEWORK EXERCISES (TIME: 10 MINUTES)

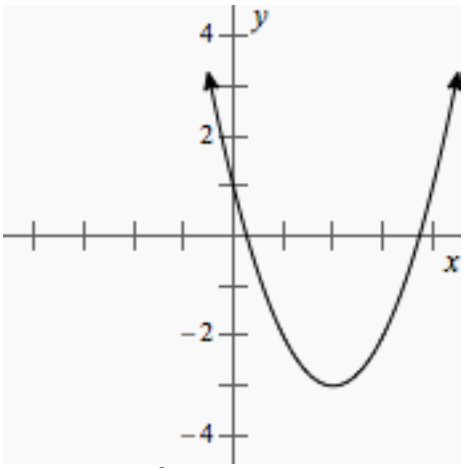
23. If $f(x) = (x+1)^2$, then the graph of $y = 4f(x)$ has its vertex at the point:

(A) $(1, 0)$
(B) $(4, 0)$
(C) $(-1, 0)$
(D) $(-4, 0)$
(E) $(-1, 4)$

24. Which of the following equations is represented by the translation of the graph of $y = (x+1)^2 - 3$ two units down and four units to the right?

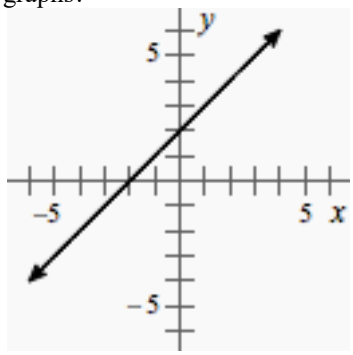
(A) $y = (x-4)^2 - 2$
(B) $y = (x+4)^2 - 2$
(C) $y = (x-1)^2 + 1$
(D) $y = (x-3)^2 - 5$
(E) $y = (x+5)^2 - 5$

25. The graph depicted below is the graph of which of the following functions?

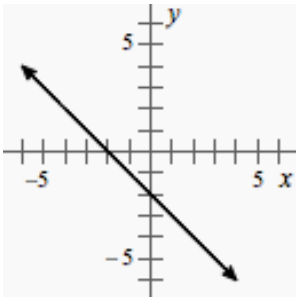


(A) $f(x) = x^2 - 2x - 3$
(B) $f(x) = (x-2)^2 - 3$
(C) $f(x) = (x+2)^2 - 3$
(D) $f(x) = (x-3)^2 - 2$
(E) $f(x) = (x+3)^2 - 2$

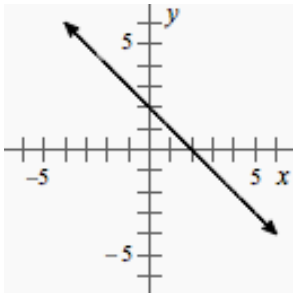
26. If the graph of $y = x + 2$ (depicted below) is rotated 270° counterclockwise about the point $(-2, 0)$, the result is which of the following graphs?



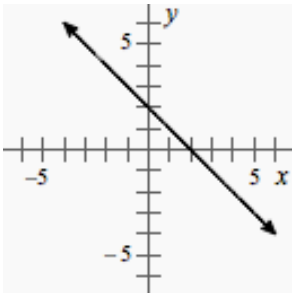
(A)



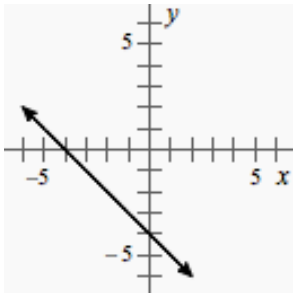
(D)



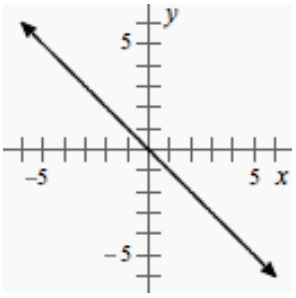
(B)



(E)



(C)

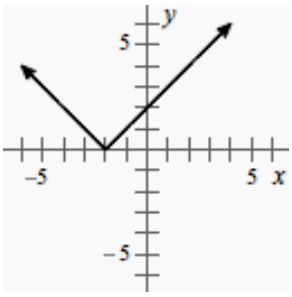


27. If $f(x) = x^2$, then the graph of $y = f(3x)$ can be obtained by applying which of the following transformations to the graph of $y = f(x)$?

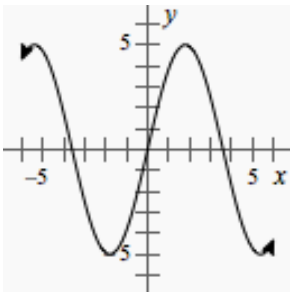
(A) A vertical stretch by a factor of 3
(B) A vertical stretch by a factor of 9
(C) A horizontal stretch by a factor of 9
(D) A translation 3 units up
(E) A translation 3 units to the right

28. A function f is an even function if and only if $f(x) = f(-x)$ for every value of x in the domain of f. The functions below are graphed in the standard xy-coordinate plane. Which graph shows an even function?

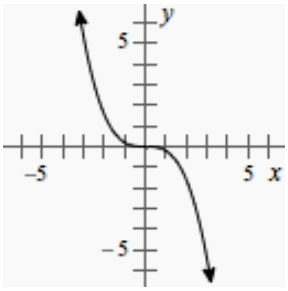
(A)



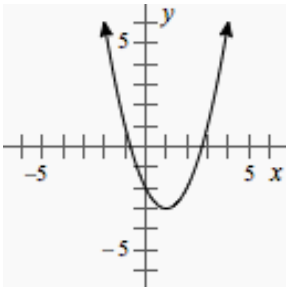
(D)



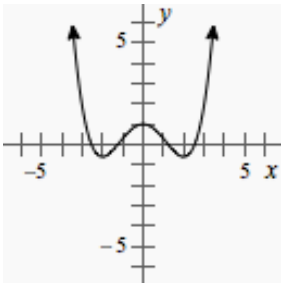
(B)



(E)



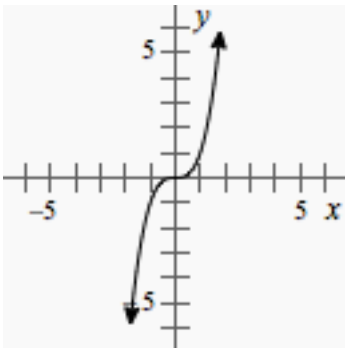
(C)



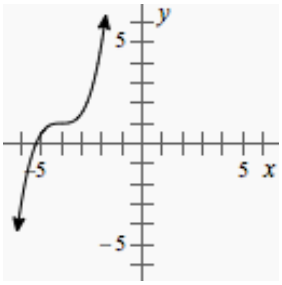
29. If a ball is thrown straight upwards, its height y at a time of t seconds after being thrown is given by the equation $y = -\frac{1}{2}gt^2 + vt + h$, where g, v, and h are constants. (The constant g represents the rate of downward acceleration due to gravity, which is the same anywhere on Earth.) If the initial height of the ball at time $t = 0$ is increased, which of the following variables MUST increase?

(A) v only
(B) h only
(C) g only
(D) v and h
(E) g and h

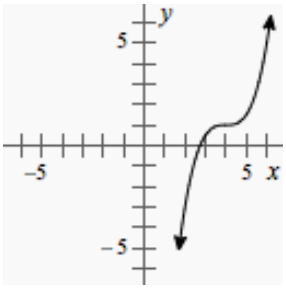
30. Given the graph of $y = x^3$ below, which of the following is the graph of $y = \frac{1}{2}(x+1)^3 - 4$?



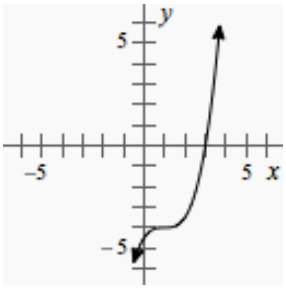
(A)



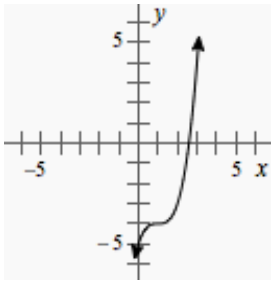
(B)



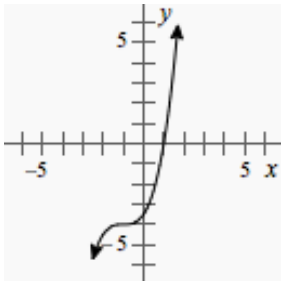
(C)



(D)



(E)



31. If $a \neq 0$ and the graph of $y = ax^2$ contains the point $(1, 1)$, then the graph of $y = a(x-1)^2$ MUST contain the point(s):

(A) $(1, 0)$
(B) $(0, 1)$
(C) $(2, 1)$
(D) All of the above
(E) None of the above

32. If the graph of $y = f(x)$ contains the point (a, b), then the graph of $y = 2f(x) - 2$ MUST contain the point(s):

(A) $(a, 2b-2)$
(B) $(a, 2b-1)$
(C) $(2a, b-2)$
(D) All of the above
(E) None of the above