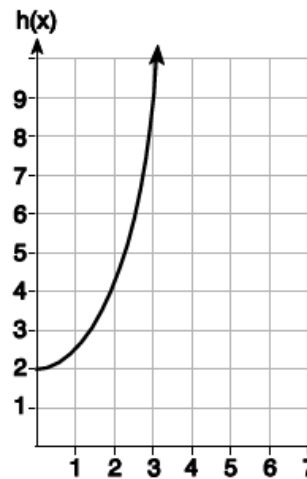


1. Given the functions $g(x)$, $f(x)$, and $h(x)$ shown below:

$$g(x) = x^2 - 2x$$

x	$f(x)$
0	1
1	2
2	5
3	7



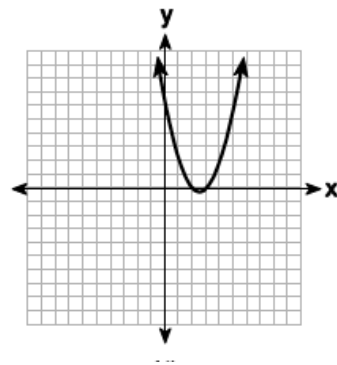
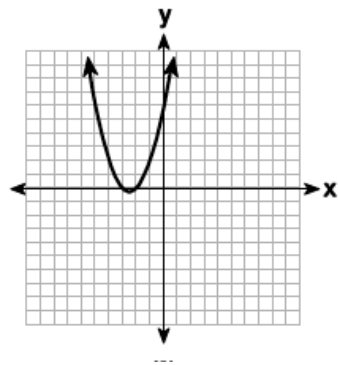
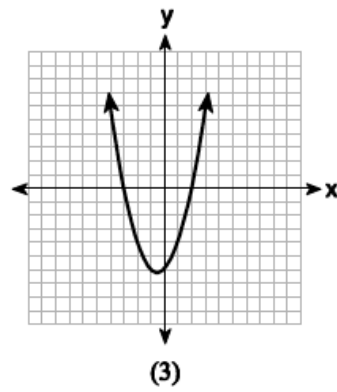
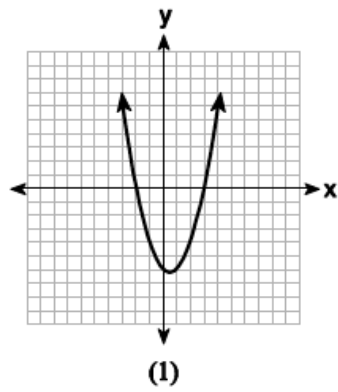
The correct list of functions ordered from greatest to least by average rate of change on interval $0 \leq x \leq 3$ is

- (1) $f(x)$, $g(x)$, $h(x)$
- (2) $h(x)$, $g(x)$, $f(x)$
- (3) $g(x)$, $f(x)$, $h(x)$

Rationale:

Option 4 is correct. Over the interval $0 \leq x \leq 3$, the average rate of change for $g(x) = \frac{3}{3} = 1$, $f(x) = \frac{6}{3} = 2$, and $h(x) = \frac{7}{3} = 2\frac{1}{3}$. Ordering these values from greatest to least results in the list of functions: $h(x)$, $f(x)$, $g(x)$.

2. The graphs below represent functions defined by polynomials. For which function are the zeros of the polynomials 2 and -3 ?



Rationale: Option 3 is correct. The graph of the polynomial intersects the x -axis at points $(-3, 0)$ and $(2, 0)$. These are the only points on the graph where $y = 0$.

3. For which function defined by a polynomial are the zeros of the polynomial -4 and -6 ?

- (1) $y = x^2 - 10x - 24$
- (2) $y = x^2 + 10x + 24$
- (3) $y = x^2 + 10x - 24$
- (4) $y = x^2 - 10x + 24$

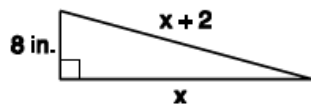
Rationale: Option 2 is correct.

$$\begin{aligned}x &= -4 \text{ and } x = -6 \\x + 4 &= 0 \text{ and } x + 6 = 0 \\0 &= (x + 4)(x + 6) \\0 &= x^2 + 4x + 6x + 24 \\0 &= x^2 + 10x + 24\end{aligned}$$

4. The length of the shortest side of a right triangle is 8 inches. The lengths are represented by consecutive odd integers. Which equation could be used for the other sides of the triangle?

- (1) $8^2 + (x + 1) = x^2$
- (2) $x^2 + 8^2 = (x + 1)^2$
- (3) $8^2 + (x + 2)^2 = x^2$
- (4) $x^2 + 8^2 = (x + 2)^2$

Rationale: Option 4 is correct.



$$a^2 + b^2 = c^2$$
$$x^2 + 8^2 = (x + 2)^2$$

5. Donna wants to make trail mix made up of almonds, walnuts and raisins. She wants to mix one part almonds, two parts walnuts, and three parts raisins. Almonds cost \$12 per pound, walnuts cost \$9 per pound, and raisins cost \$5 per pound.

Donna has \$15 to spend on the trail mix. Determine how many pounds of trail mix she can make. [Only an algebraic solution can receive full credit.]

Rationale: Let x = pounds of an ingredient. Then the number of pounds of trail mix is represented by the expression $x + 2x + 3x$. Therefore, the number of pounds of mix is $6x$. Then,

$$12x + 9(2x) + 5(3x) = 15$$

$$45x = 15$$

$$x = \frac{1}{3}$$

$$\text{So, } 6\left(\frac{1}{3}\right) = 2 \text{ pounds.}$$

Rubric: