Finding Average Rate of Change from Equations

1. $y = x^2 + 1$

When $x = -1$
$y = x^2 + 1$
$= (-1)^2 + 1$
$= 1 + 1$
$= 2$
$(-1, 2)$

When $x = 3$
$y = x^2 + 1$
$= (3)^2 + 1$
$= 9 + 1$
$= 10$
$(3, 10)$

$$AROC = \frac{y_2 - y_1}{x_2 - x_1} = \frac{10 - 2}{3 - -1} = \frac{8}{4} = 2$$

May 7-3:07 PM

2. $y = (x+1)(x-2)$

When $x = 1$
$y = (x+1)(x-2)$
$= (1+1)(1-2)$
$= (2)(-1)$
$= -2$
$(1, -2)$

When $x = 3$
$y = (x+1)(x-2)$
$= (3+1)(3-2)$
$= (4)(1)$
$= 4$
$(3, 4)$

$$AROC = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - -2}{3 - 1} = \frac{6}{2} = 3$$

May 7-3:08 PM

3. A) $h = -2t^2 + 6t$

When $t = 1$
$h = -2t^2 + 6t$
$= -2(1)^2 + 6(1)$
$= -2(1) + 6$
$= -2 + 6$
$= 4$
$(1, 4)$

When $t = 3$.
$h = -2t^2 + 6t$
$= -2(3)^2 + 6(3)$
$= -2(9) + 18$
$= -18 + 18$
$= 0$
$(3, 0)$

$$AROC = \frac{y_2 - y_1}{x_2 - x_1} = \frac{0 - 4}{3 - 1} = \frac{-4}{2} = -2$$

May 7-3:09 PM

B) $h = -2t^2 + 6t$

When $t = 0$
$h = -2t^2 + 6t$
$= -2(0)^2 + 6(0)$
$= 0 + 0$
$= 0$
$(0, 0)$

When $t = 2$
$h = -2t^2 + 6t$
$= -2(2)^2 + 6(2)$
$= -2(4) + 12$
$= -8 + 12$
$= 4$
$(2, 4)$

$$AROC = \frac{y_2 - y_1}{x_2 - x_1} = \frac{4 - 0}{2 - 0} = \frac{4}{2} = 2$$

May 7-3:09 PM

4. $C = -3A + 5$

When $A = 1$
$C = -3A + 5$
$= -3(1) + 5$
$= -3 + 5$
$= 2$
$(1, 2)$

When $A = 3$
$C = -3A + 5$
$= -3(3) + 5$
$= -9 + 5$
$= -4$
$(3, -4)$

$$AROC = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-4 - 2}{3 - 1} = \frac{-6}{2} = -3$$

May 7-3:09 PM

5. $P = 10h + 3$

When $h = 0$
$P = 10h + 3$
$= 10(0) + 3$
$= 0 + 3$
$= 3$
$(0, 3)$

When $h = 8$
$P = 10h + 3$
$= 10(8) + 3$
$= 80 + 3$
$= 83$
$(8, 83)$

$$AROC = \frac{y_2 - y_1}{x_2 - x_1} = \frac{83 - 3}{8 - 0} = \frac{80}{8} = 10$$

May 7-3:09 PM

6. $h = -2t^2 + 3t + 1$

A.

When $t = 3$

$h = -2t^2 + 3t + 1$
$= -2(3)^2 + 3(3) + 1$
$= -2(9) + 9 + 1$
$= -18 + 10$
$= -8$
$(3, -8)$

When $t = 5$

$h = -2t^2 + 3t + 1$
$= -2(5)^2 + 3(5) + 1$
$= -2(25) + 15 + 1$
$= -50 + 16$
$= -34$
$(5, -34)$

$$AROC = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-34 - -8}{5 - 3} = \frac{-26}{2} = -13$$

May 7-3:10 PM

B. $h = -2t^2 + 3t + 1$

When $t = 0$

$h = -2t^2 + 3t + 1$
$= -2(0)^2 + 3(0) + 1$
$= 0 + 0 + 1$
$= 1$
$(0, 1)$

When $t = 2$

$h = -2t^2 + 3t + 1$
$= -2(2)^2 + 3(2) + 1$
$= -2(4) + 6 + 1$
$= -8 + 7$
$= -1$
$(2, -1)$

$$AROC = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-1 - 1}{2 - 0} = \frac{-2}{2} = -1$$

May 7-3:10 PM

7. $y = x^3 + 2$

A.

When $x = 0$

$y = x^3 + 2$
$= (0)^3 + 2$
$= 0 + 2$
$= 2$
$(0, 2)$

When $x = 2$

$y = x^3 + 2$
$= (2)^3 + 2$
$= 8 + 2$
$= 10$
$(2, 10)$

$$AROC = \frac{y_2 - y_1}{x_2 - x_1} = \frac{10 - 2}{2 - 0} = \frac{8}{2} = 4.$$

May 7-3:10 PM

B. $y = x^3 + 2$

When $x = -1$

$y = x^3 + 2$
$= (-1)^3 + 2$
$= -1 + 2$
$= 1$
$(-1, 1)$

When $x = 1$

$y = x^3 + 2$
$= (1)^3 + 2$
$= 1 + 2$
$= 3$
$(1, 3)$

$$AROC = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - 1}{1 - -1} = \frac{2}{2} = 1$$

May 7-3:10 PM

8. $y = |x| + 2$

When $x = -3$

$y = |x| + 2$
$= |-3| + 2$
$= 3 + 2$
$= 5$
$(-3, 5)$

When $x = -1$

$= |x| + 2$
$= |-1| + 2$
$= 1 + 2$
$= 3$
$(-1, 3)$

$$AROC = \frac{y_2 - y_1}{x_2 - x_1} = \frac{3 - 5}{-1 - -3} = \frac{-2}{2} = -1$$

May 7-3:10 PM