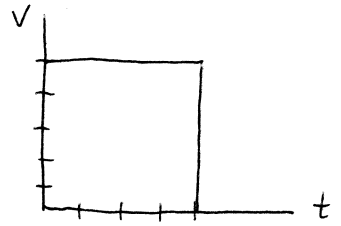
Section 6.1: 1-6 all

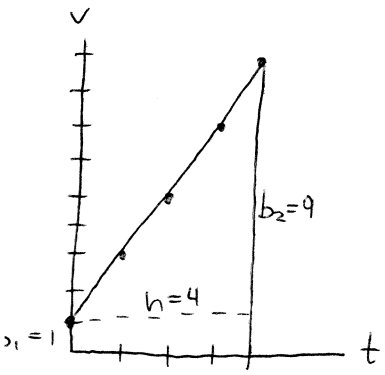
1. $v(t) = 5$



$D = R \cdot T$

$X = v \cdot t = 5 \cdot 4 = \boxed{20}$

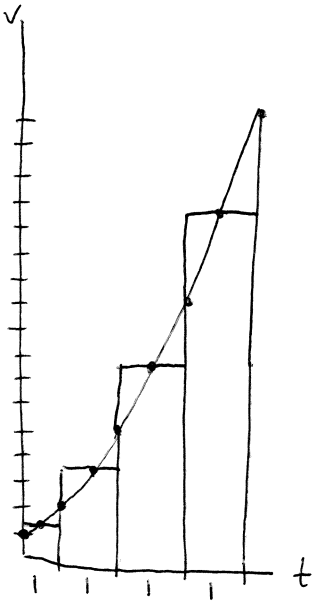
2. $v(t) = 2t + 1$



$A = \frac{1}{2}h(b_1 + b_2)$ or triangle + rectangle = total area

$A = \frac{1}{2} \cdot 4(1+9) = 2 \cdot 10 = \boxed{20}$

3. $v(t) = t^2 + 1$



$v(0.5) = 1.25$

$v(1.5) = 3.25$

$v(2.5) = 7.25$

$v(3.5) = 13.25$

$A = bh = 1(1.25) + 1(3.25) + 1(7.25) + 1(13.25)$

$A = \boxed{25}$

4. Same 4 rectangles from question 3, plus one more midpoint rectangle between $4 \le t \le 5$.

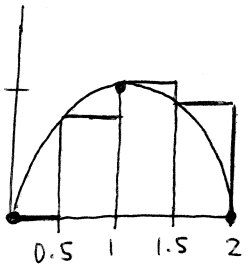
$v(4.5) = 21.25$

$A = 25 + 1(21.25) = \boxed{46.25}$

5. $y = 2x - x^2 \rightarrow x(2-x)$

a) $x(2-x) = 0 \rightarrow x = 0, x = 2$

$y(1) = 2 - 1^2 = 1$



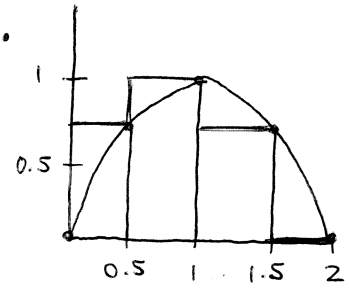
b) $y(0) = 0$, $y(0.5) = 2(0.5) - (0.5)^2 = 1 - 0.25 = 0.75$, $y(1) = 1$, $y(1.5) = y(0.5) = 0.75$

$A = bh$

$LRAM = 0.5(0) + 0.5(0.75) + 0.5(1) + 0.5(0.75)$

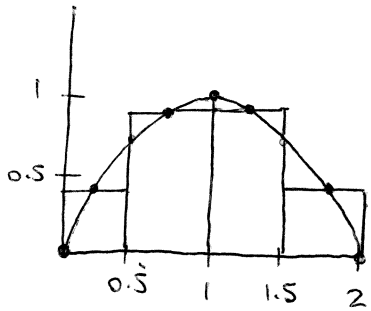
$LRAM = 0.5(0 + 0.75 + 1 + 0.75) = 0.5(2.5) = \boxed{1.25}$

6.



$RRAM = 0.5(0.75) + 0.5(1) + 0.5(0.75) + 0.5(0)$

$RRAM = 0.5(0.75 + 1 + 0.75 + 0) = 0.5(2.5) = \boxed{1.25}$



$y(1/4) = 2(\frac{1}{4}) - (\frac{1}{4})^2 = \frac{1}{2} - \frac{1}{16} = \frac{8}{16} - \frac{1}{16} = \frac{7}{16}$

$y(3/4) = 2(\frac{3}{4}) - (\frac{3}{4})^2 = \frac{6}{4} - \frac{9}{16} = \frac{24}{16} - \frac{9}{16} = \frac{15}{16}$

$y(1.25) = y(3/4) = \frac{15}{16}$ by symmetry

$y(1.75) = y(1/4) = \frac{7}{16}$ by symmetry

$MRAM = 0.5(\frac{7}{16}) + 0.5(\frac{15}{16}) + 0.5(\frac{15}{16}) + 0.5(\frac{7}{16})$

$MRAM = \frac{1}{2}(\frac{7}{16} + \frac{15}{16} + \frac{15}{16} + \frac{7}{16}) = \frac{1}{2}(\frac{44}{16}) = \frac{44}{32} = \frac{11}{8} = \boxed{1.375}$