1. (6pts) Let $A = (2, -3)$. $B = (7, 2)$, $C = (1, 1)$.
a) Find the distance between A and the midpoint of B and C.
b) Is the triangle ABC a right triangle?

a) $M = \left(\frac{7+1}{2}, \frac{2+1}{2} \right) = \left(4, \frac{3}{2} \right)$

$d(A, M) = \sqrt{(4-2)^2 + \left(\frac{3}{2} - (-3) \right)^2}$

$= \sqrt{2^2 + \left(\frac{9}{2} \right)^2}$

$= \sqrt{4 + \frac{81}{4}}$

$= \sqrt{\frac{16 + 81}{4}} = \frac{\sqrt{97}}{2}$

b) $d(A, B) = \sqrt{(7-2)^2 + (2-(-3))^2} = \sqrt{5^2 + 5^2} = \sqrt{50}$

$d(B, C) = \sqrt{(7-1)^2 + (2-1)^2} = \sqrt{6^2 + 1^2} = \sqrt{37}$

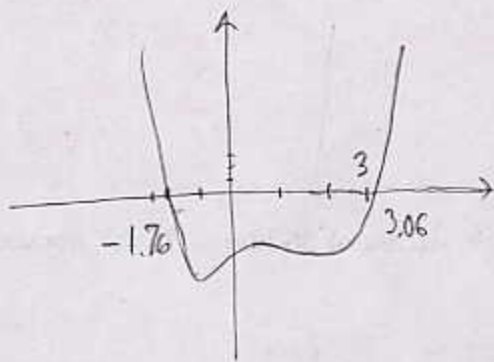$d(A, C) = \sqrt{(2-1)^2 + (-3-1)^2} = \sqrt{1^2 + (-4)^2} = \sqrt{17}$

$d(A, C)^2 + d(B, C)^2 \overset{?}{=} d(A, B)^2$

$(\sqrt{17})^2 + (\sqrt{37})^2 \overset{?}{=} (\sqrt{50})^2$

$17 + 37 \overset{?}{=} 50$ no,

so not a right triangle

2. (6pts) Use your calculator to sketch the graph of $y = x^4 - 3x^3 + 5x - 17$. Make sure all the features of the graph are visible and indicate your viewing window. Find the all the x-intercepts and the y-intercept to two decimal places.

$[-5, 5] \times [-20, 20]$

y-int: $y = -17$ (put $x = 0$)

x-int: $-1.76, 3.06$

3. (8pts) Solve the following equations for x:

a) $c^2 x - c = d + d^2 x$

$c^2 x - d^2 x = d + c$

$x(c^2 - d^2) = d + c$

$x = \dfrac{d+c}{c^2-d^2} = \dfrac{d+c}{(c-d)(c+d)} = \dfrac{1}{c-d}$

b) $\dfrac{a+bx}{b+ax} = 2b - a \quad \Big| \cdot (b+ax)$

$a + bx = 2b^2 - ab + 2bax - a^2 x$

$a - 2b^2 + ab = 2bax - a^2 x - bx$

$a - 2b^2 + ab = x(2ba - a^2 - b) \quad \Big| \div (2b - a^2 - b)$

$x = \dfrac{a - 2b^2 + ab}{2ab - a^2 - b}$

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4. (5pts) On three exams, Bill has scores of 89, 81 and 73. What is the minimal score he needs on exam 4 so that the average of the exams is at least 84?

$x = $ score on exam 4

$\dfrac{89 + 81 + 73 + x}{4} = 84 \quad | \cdot 4$

$243 + x = 336 \quad | - 243$

$x = 93$

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5. (5pts) Sheryl is paid 25% extra for hours worked in excess of 36 hours. If she worked 46 hours and earned \$457.84, what is her hourly wage?

$x = $ Sheryl's regular hourly rate $\leftarrow$ worked 36 hours

$1.25x = \quad - \quad$ increased $\_\_\_\_ \leftarrow$ worked 10 hours

$(x + 0.25x)$

$36x + 10 \cdot 1.25x = 457.84$

$36 + 12.5x = 457.84$

$48.5x = 457.84$

$x = \dfrac{457.84}{48.5} = 9.44$

\$9.44 is her regular hourly rate