3) Simplify the following

a) $(2\sqrt{3}+1)^2$

$(2\sqrt{3}+1)(2\sqrt{3}+1)$

$4\cdot 3 + 2\sqrt{3} + 2\sqrt{3} + 1$

$12 + 4\sqrt{3} + 1$

$13 + 4\sqrt{3}$

b) $\dfrac{6\sqrt{12}}{12\sqrt{6x}}$

$\dfrac{1\sqrt{2}}{2\sqrt{x}}\left(\dfrac{\sqrt{x}}{\sqrt{x}}\right)$

$\dfrac{\sqrt{2x}}{2x}$

c) $\dfrac{4}{2-\sqrt{8}}$ reduce first/last $\left(\dfrac{2+\sqrt{8}}{2+\sqrt{8}}\right)$

$\dfrac{8+4\sqrt{8}}{4+2\sqrt{8}-2\sqrt{8}-8}$

$\dfrac{8+4\sqrt{8}}{-4} = \dfrac{4(2+\sqrt{8})}{-4} = \dfrac{2+\sqrt{4\cdot 2}}{-1}$

$= \dfrac{2+2\sqrt{2}}{-1}\left(\dfrac{-1}{-1}\right)$

$= -2-2\sqrt{2}$

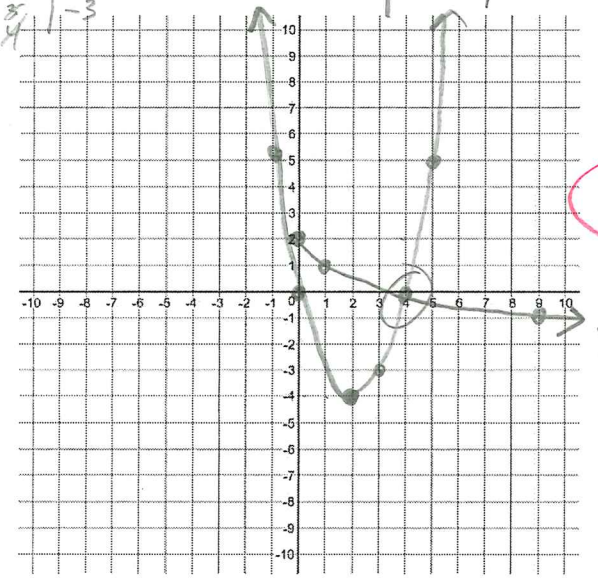
4) Solve graphically + check the solution

$2-\sqrt{x} = (x-2)^2 - 4$

$y_1 = -\sqrt{x}+2 \quad / \quad y_2 = (x-2)^2-4$

(0, 2) (2, -4)

x	y	-y
1	1	-1
4	2	-2
9	3	-3
16	4	



$x = 4$

$2-\sqrt{4} = (4-2)^2-4$

$2-2 = (2)^2-4$

$0 = 4-4$

$0 = 0$ ✓

$x = 4$

d) Solve algebraically

$-6+2\sqrt{5x+81} = 2x$ $+6$ $/2$

$+6 \quad /2$

$(\sqrt{5x+81})^2 = (x+3)^2$

$5x+81 = x^2+6x+9$

$-5x-81 \quad -5x-81$

$0 = x^2+x-72$

$0 = (x+9)(x-8)$

$x = -9, 8$

extraneous

$x = -9$

$-6+2\sqrt{5(-9)+81} = 2(-9)$

$-6+2\sqrt{-45+81} = -18$

$-6+2\sqrt{36} = -18$

$-6+2(6) = -18$

$-6+12 = -18$

$6 \neq -18$ ✗

$x = 8$

$-6+2\sqrt{5(8)+81} = 2(8)$

$-6+2\sqrt{40+81} = 16$

$-6+2\sqrt{121} = 16$

$-6+2(11) = 16$

$-6+22 = 16$

$16 = 16$ ✓

1) Complete the square and graph the following.

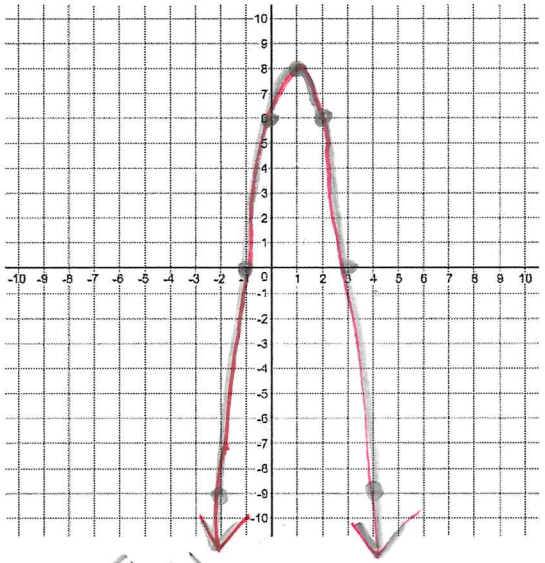
$y = -2x^2 + 4x + 6$

$(\frac{2}{2})^2 = (1)^2 = 1$

$y = -2(x^2 - 2x + 1 - 1) + 6$

$y = -2(x^2 - 2x + 1) + 2 + 6$

$y = -2(x-1)^2 + 8$ (1, 8)



Vertex (1, 8)

Eqn of axis of symmetry $x = 1$

y-intercept 6 or (0, 6)

x-intercept -1, 3 or (-1, 0), (3, 0)

Domain $\{x \mid x \in \mathbb{R}\}$

Range $\{y \mid y \leq 2, y \in \mathbb{R}\}$

Max. or Min. value $y = 8$
(circle one)

x	y	-2
1	8	-2
2	4	-8
3	0	-18
4	16	

2) Solve the following: $12x^2 + 24x = -9$ → $\frac{12x^2+24x+9}{3} = \frac{0}{3}$

a) List the four methods you could use.

1) graphing
2) factoring
3) square rooting
4) Quad. eqn.

b) Use the discriminant to determine the nature of the roots $4x^2 + 8x + 3 = 0$

$b^2 - 4ac$
$(24)^2 - 4(12)(9)$
$576 - 432$
$144 > 0$
∴ 2 roots

$b^2 - 4ac$
$8^2 - 4(4)(3)$
$64 - 48$
$16 > 0$

c) Solve using two of these methods

square rooting $(\frac{2}{2})^2 = (1)^2 = 1$

$4x^2 + 8x + 3 = 0$

$4(x^2 + 2x + 1 - 1) + 3 = 0$

$4(x+1)^2 - 4 + 3 = 0$

$4(x+1)^2 - 1 = 0$

$+1 \quad +1$

$\frac{4(x+1)^2}{4} = \frac{1}{4}$

$\sqrt{(x+1)^2} = \sqrt{\frac{1}{4}}$

$x + 1 = \pm\frac{1}{2}$ -1 -1

$x = +\frac{1}{2} - 1(\frac{2}{2})$

$, -\frac{1}{2} - 1(\frac{2}{2})$

$x = -1/2, -3/2$

$x = \frac{-b \pm \sqrt{b^2-4ac}}{2a}$

$x = \frac{-8 \pm \sqrt{8^2-4(4)(3)}}{2(4)}$

$x = \frac{-8 \pm \sqrt{64-48}}{8}$

$x = \frac{-8 \pm \sqrt{16}}{8}$

$x = \frac{-8 \pm 4}{8}$

$x = \frac{-8+4}{8}, \frac{-8-4}{8}$

$x = -4/8, -12/8$

$x = -1/2, -3/2$

$4x^2 + 2x + 6x + 3 = 0$

$2x(2x+1) + 3(2x+1) = 0$

$(2x+1)(2x+3) = 0$

$x = -\frac{3}{2}, -\frac{1}{2}$

X 12
+ 8
2, 6

please don't graph ...