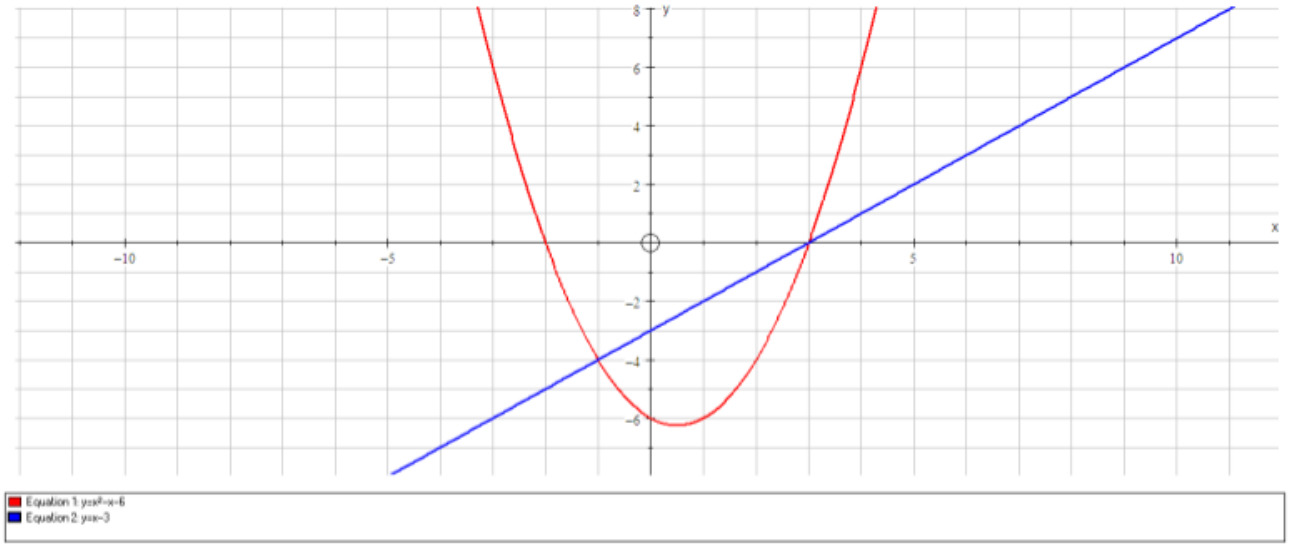
Simultaneous equations



$y = x^2 - x - 6$
$y = x - 3$

$x = -1 \quad y = -4$
$x = 3 \quad y = 0$

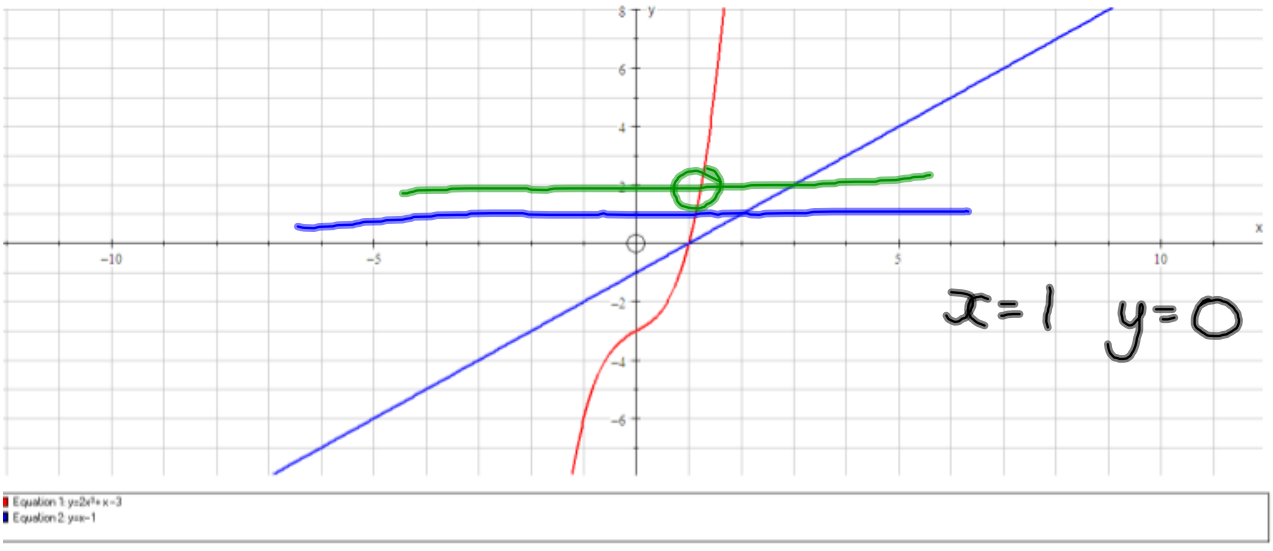
Draw the graphs of

$y = 2x^3 + x - 3$ and $y = x - 1$

Hence solve the equations

$y = 2x^3 + x - 3$

and $y = x - 1$



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On graph paper draw the graph of $y=2x^2-4$ (Use a whole page)

EITHER work all the way through OR do odds only.

$y=2x^2-4$

a) $2x^2=7$

$2x^2-4=7-4$

$2x^2-4=3$

$y=3$

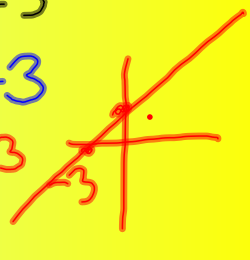
$x=-1.\dot{7}$ $x=1.7$

b) $2x^2-4=x+3$

$y=x+3$

$0=x+3$

$-3=x$



$x=-1.6$ $y=-1.5$

$x=2.1$ $y=5$ ish

$y=2x^2-4$

$2x^2-2x-1=0$

$2x^2=2x+1$

$2x^2-4=2x+1-4$

$2x^2-4=2x-3$

Algebraic approach: simultaneous equations revision

Solve

$x+y=15$
$y-x=1$ } +

$2y=16$
$y=8$

$x+8=15$
$x=7$

$x+2y=10$ ①
$2x-y=10$ ②

② by 2 $4x-2y=20$ ③ } +
$x+2y=10$ ①

$5x=30$
$x=6$

Substituting $x=6$ into ① $6+2y=10$
$2y=4$
$y=2$

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$y=2x$ ①
$y+8x=20$ ②

Substituting ① into ② $2x+8x=20$
$10x=20$
$x=2$

Substituting $x=2$ into ①
$y=2\times2=4$

i) $5b-3a=8$ } ①
$20-9b=3a$ } ②

Substituting ② into ①

$5b-(20-9b)=8$
$5b-20+9b=8$
$14b-20=8$
$14b=28$
$b=2$

$a=\frac{2}{3}$

D1 b, e, h

D2 onwards

Simultaneous equations: algebraic solutions with one linear and one not.

Solve the simultaneous equations:

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$y = 11x - 2$ and $y = 5x^2$

$11x - 2 = 5x^2$

$0 = 5x^2 - 11x + 2$

$(5x - 1)(x - 2) = 0$

$x = \frac{1}{5}$ or 2

$5x^2 - x - 10x + 2$

$x = 2 \Rightarrow y = 20$

$x = \frac{1}{5} \Rightarrow y = \frac{1}{5}$

$x + y = 2$ and $y = x^2$

$y = 2 - x$

$2 - x = x^2$

$0 = x^2 + x - 2$

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

$x = 1$ or $x = 2$

$y = 1$ $\quad y = 4$

$x = 2 - y$

$y = (2 - y)^2$

$5x + y = 6$ and $y = x^2 + 4$

$y = 6 - 5x$

$6 - 5x = x^2 + 4$

$0 = x^2 + 5x - 2$

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

$x = \frac{-5 \pm \sqrt{25 - (-8)}}{2}$

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$= \frac{-5 \pm \sqrt{33}}{2}$

$x = \frac{-5 + \sqrt{33}}{2}$ or $x = \frac{-5 - \sqrt{33}}{2}$

$x = -5.37$ and $x = 0.37$

$y = 32.85$ $\quad y = 4.14$