

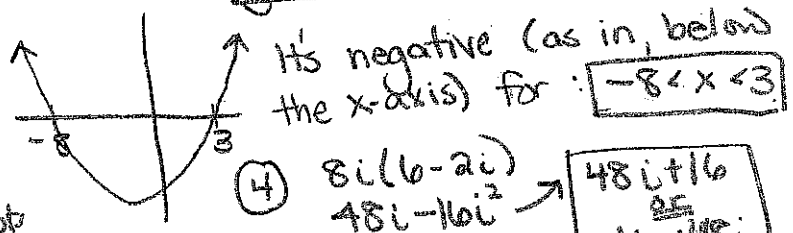
① Find the vertex: $y = x^2 - 42x$
 ② $f(x)$ is translated 5 down, 1 unit right. Write in $ax^2 + bx + c$ form

① $x = -\frac{b}{2a} = -\frac{(-42)}{2(1)} = 21$
 $y = (21)^2 - 42(21) = -441$
 $(21, -441)$

② $y = (x-1)^2 - 5$
 $y = (x-1)(x-1) - 5$
 $y = x^2 - 2x + 1 - 5$
 $y = x^2 - 2x - 4$

③ When is $y = x^2 + 5x - 24$ negative?

③ $y = (x+8)(x-3)$
 $0 = (x+8)(x-3)$
 $x = -8$ & $x = 3$
 are the x-intercepts



④ Multiply $8i(6-2i)$

④ $8i(6-2i)$
 $48i - 16i^2$
 $48i + 16$
 $16 + 48i$

⑤ Solve $x^2 - 11x + 12 = 0$

⑤ One option is factoring:
 $x^2 - 11x + 12 = 0$
 $(x-12)(x-1) = 0$
 $x = 12, -1$

⑥ $\sqrt{x^2} = \sqrt{-400}$
 $x = \pm 20i$

⑥ Solve over the complex #: $x^2 = -400$

⑦ $x^2 - (-9)$
 $(x+3i)(x-3i)$

⑧ $y = x^2 + 12x + 36 + 2 + -36$
 $y = (x+6)^2 - 34$
 $(\frac{12}{2})^2 = 36$

⑦ Factor: $x^2 + 9$

⑩ One option is using Quadratic Formula
 $a=1$
 $b=7$
 $c=15$
 $\frac{-7 \pm \sqrt{49 - 4(1)(15)}}{2(1)}$
 $\frac{-7 \pm \sqrt{-11}}{2}$
 $\frac{-7 \pm i\sqrt{11}}{2}$

⑧ Write in vertex form: $y = x^2 + 12x + 2$

⑨ Re-write in $a+bi$: $\frac{8}{9-2i}$

⑨ $\frac{8}{(9-2i)(9+2i)}$
 $\frac{72 + 16i}{81 - 4i^2} = \frac{72 + 16i}{85}$

⑩ Solve: $x^2 + 7x + 15 = 0$

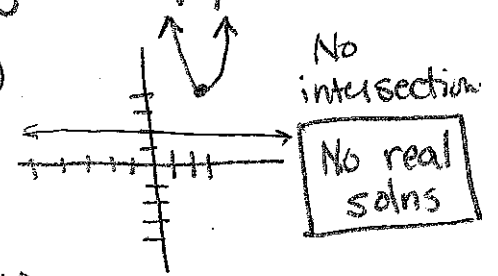
⑪ $y = -16x^2 + 160x + 100$
 a) Find vertex:
 $x = -\frac{b}{2a} = -\frac{160}{2(-16)} = 5$
 $y = -16(5)^2 + 160(5) + 100 = 500$
 reaches max height 500 after 5 seconds.

⑪ A projectile is launched & follows path $y = -16x^2 + 160x + 100$
 Find a) max height
 b) initial height
 c) when it hits ground
 d) will it reach a height of 700?

⑫ $y = x^2 + 15x + 3$
 $x = -\frac{b}{2a} = -\frac{15}{2(1)} = -\frac{15}{2}$
 $y = (-\frac{15}{2})^2 + 15(-\frac{15}{2}) + 3 = -\frac{213}{4}$
 Vertex at $(-\frac{15}{2}, -\frac{213}{4})$ min
 domain: all real #'s
 range: $[-\frac{213}{4}, \infty)$

⑫ $y = x^2 + 15x + 3$
 Identify max/min, domain, & range

⑬ initial height = y-int = 100
 c) ground = x-int set $y=0$
 $0 = -16x^2 + 160x + 100$
 $\frac{-160 \pm \sqrt{(160)^2 - 4(-16)(100)}}{2(-16)}$
 $\frac{-160 \pm \sqrt{32000}}{-32} = -5.59, 10.59$
 10.59 seconds



⑬ Determine number of real solns: $\begin{cases} y = (x-3)^2 + 4 \\ y = 2 \end{cases}$

⑭ option 1 - sketch
 option 2
 $700 = -16x^2 + 160x + 100$
 $0 = -16x^2 + 160x - 600$
 discriminant: $(160)^2 - 4(-16)(-600)$
 $= -12800 \leftarrow \text{Neg} \leftarrow \text{no real soln}$
 No

