

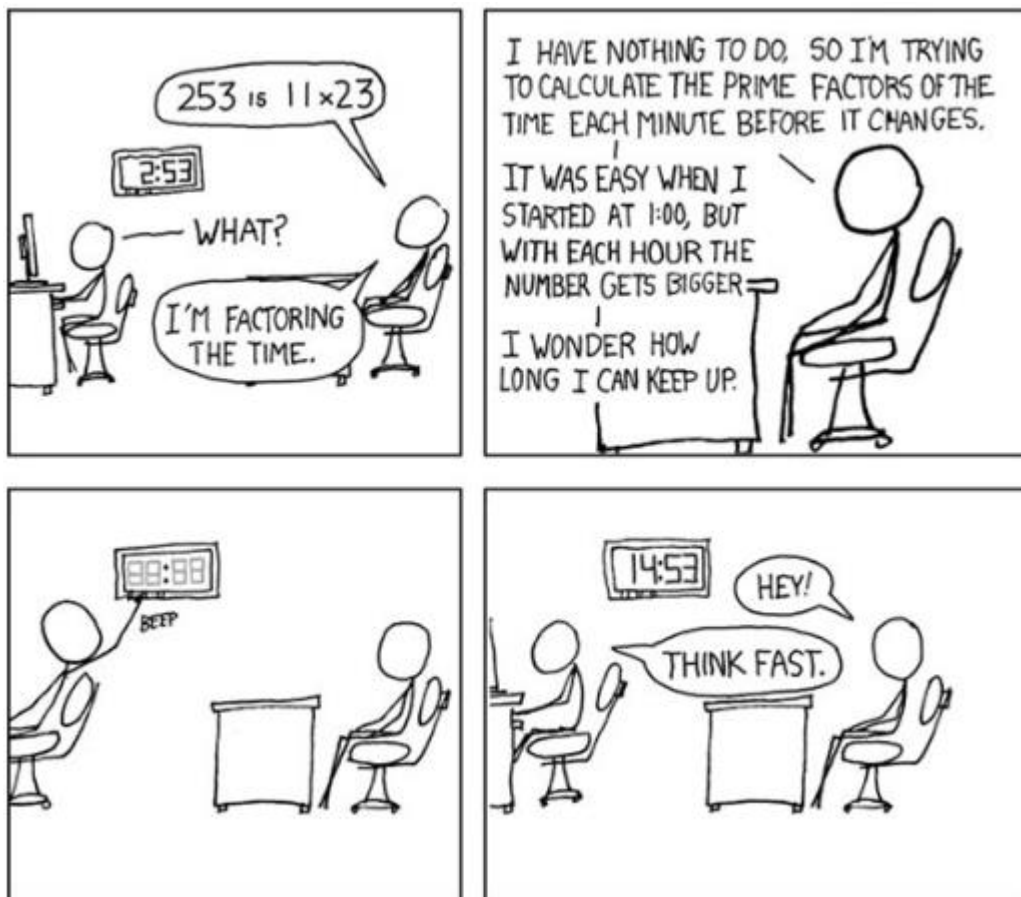
# CLASS DISCUSSION: 13 NOVEMBER 2018

## FACTORIZING

$$a^2 - b^2 = (a + b)(a - b)$$

$$a^3 + b^3 = (a + b)(a^2 - ab + b^2)$$

$$a^3 - b^3 = (a - b)(a^2 + ab + b^2)$$



1. **Factor fully** each of the following expressions:

- (a)  $x^3 - x^2$
- (b)  $54 - 81t$
- (c)  $5x - 25x^2$
- (d)  $t^2 - 7t + 12$
- (e)  $x^2 + 21x + 90$
- (f)  $x^2 - 21x + 104$
- (g)  $u^2 - 19u + 78$
- (h)  $x^2 - 23x + 132$
- (i)  $x^4 + 8x^2 + 7$
- (j)  $x^2 - x - 6$
- (k)  $s^2 + s - 156$
- (l)  $x^2 + x - 110$
- (m)  $x^2 - 9x - 90$
- (n)  $x^2 - 12x - 85$
- (o)  $x^2 + 18x - 115$

- (p)  $2x^2 + 3x + 1$
- (q)  $3x^2 + 10x + 3$
- (r)  $2x^2 + 9x + 4$
- (s)  $5t^2 + 11t + 2$
- (t)  $3x^2 + x - 2$
- (u)  $2x^2 + 15x - 8$
- (v)  $4z^2 + z - 14$
- (w)  $3x^2 - 13x + 14$
- (x)  $a^2b^4c^3 - 4a^2b^2c^2$
- (y)  $3a^8b^{13}k^5 - 6a^6b^{11}k^2 + 18a^4b^{15}k^{2014}$
- (z)  $5r^4s^3t^9 - 25r^5s^3t^{19} + 10r^4s^2t^9 - 15r^6s^{99}t^8$

## 2. *Difference of two squares*

- (a)  $575^2 - 425^2$  (no calculator)
- (b)  $121^2 - 120^2$  (no calculator)
- (c)  $2013^2 - 2011^2$  (no calculator)
- (d)  $10001^2 - 1$  (no calculator)
- (e)  $121x^2 - 81$
- (f)  $x^4 - 9$
- (g)  $x^{16} - 1$
- (h)  $(a + b)^2 - c^2$
- (i)  $(x + 5)^2 - 4$
- (j)  $(x + 4)^2 - (7 - 2x)^2$
- (k)  $1 - 25x^2$
- (l)  $25x^2 - 64$
- (m)  $(2a + b + c)^2 - (a - b + c)^2$

## 3. *Solve each of the following equations by factoring first.*

- (a)  $x^4 - 3x^3 = 0$
- (b)  $x^2 - 38x - 80 = 0$
- (c)  $2x^2 - 13x - 15 = 0$
- (d)  $x^5 - 6x^4 + 9x^3 = 0$
- (e)  $x^5 - x/16 = 0$
- (f)  $(x - 5)^4(1 - 625x^2)(3x^2 - 13x + 14)(x^2 + 5) = 0$

4. How does one factor the *sum or difference of two cubes*?  $x^3 + a^3$  or  $x^3 - a^3$

## 5. Factor by *grouping*:

- (a)  $x^2 - 7x + 3x - 21$
- (b)  $2x^4 - x^3 + 4x - 2$
- (c)  $x^5 - x^4 + 8x^2 - 8x$
- (d)  $x^3 - x^2 + x - 1$
- (e)  $x^4 + 2x^3 + x + 2$

*Algebra is the intellectual instrument which has been created for rendering clear the quantitative aspects of the world.*

- Sir Alfred North Whitehead