March 28th

A tank can be filled by three pipes.
Pipe A can fill the tank in 16 hours.
Pipe B can fill the tank in 12 hours.
Pipe C can fill the tank in 8 hours.

How long will it take to fill the tank when all three pipes are turned on but at the same time it is being drained by a pipe that can empty it in 6 hours?

If the tank has volume V

Pipe A fills at a rate of V/16

Pipe B fills at a rate of V/12

Pipe C fills at rate of V/8

Drain empties at a rate of V/6

Therefore net rate =

$$\frac{V}{16} + \frac{V}{12} + \frac{V}{8} - \frac{V}{6} = \frac{5V}{48}$$

Time = Volume ÷ rate

Therefore time = $V \div \frac{5V}{48} = 9.6$ hours = **9 hours 36 minutes**