



**RIPE NCC**  
RIPE NETWORK COORDINATION CENTER

# Easter, Explained

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How the position of the Moon influences  
up to 50% of all public holidays in the  
Netherlands

# What is Easter



## The miracle of resurrection

- The **biggest** Christian festival
- Aligned with spring
- First **Sunday after** the first **spring full moon**
  - relates to Jewish holiday Pesach
- Different rules per church:
  - **This is about Western Church**
  - Eastern (Orthodox) Church still follows Julian Calendar





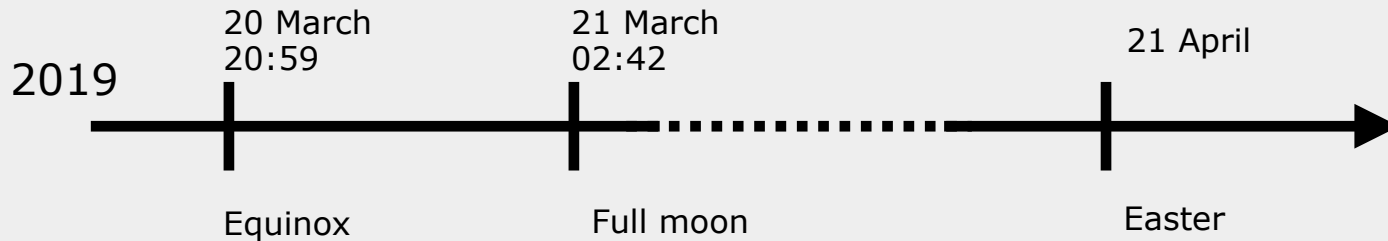
# Date of Easter

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## First Sunday after the first spring full moon

- But **not too precise!**
- *Paradoxical Easter* happens when real equinox and/or full moon differs from ancient approximations





## First Sunday after the first spring full moon

- Ancient **calculations with approximations** are used
- Approximate full moon **repeats every 19 years**
- A look-up-table can be used (*this one has issues before 20th century*)

```
# Full moon LUT source http://www.whyeaster.com/customs/dateofeaster.shtml
easterlut = [
    (4, 14), (4, 3), (3, 23), (4, 11), (3, 31), (4, 18), (4, 8),
    (3, 28), (4, 16), (4, 5), (3, 25), (4, 13), (4, 2), (3, 22),
    (4, 10), (3, 30), (4, 17), (4, 7), (3, 27),
]
fullmoon = datetime.date(year, *easterlut[year % 19])
daystosunday = 7 if fullmoon.weekday() == 6 else 6 - fullmoon.weekday()
easterday = fullmoon + datetime.timedelta(daystosunday)
print("Easter Sunday is on", easterday)
```



## Gauss's Easter Algorithm

- Only **adding, multiplying, subtracting** and **integer division/modulo**
- Published in 1800
- *Motivation:* his mother did not remember his precise date of birth

```
a, b, c = (year % x for x in [19, 4, 7])
k = year // 100
p = (13 + 8 * k) // 25
q = k // 4
M = (15 - p + k - q) % 30
N = (4 + k - q) % 7
d = (19 * a + M) % 30
e = (2 * b + 4 * c + 6 * d + N) % 7
easterday = datetime.date(year, 3, 22) + datetime.timedelta(d + e)
print("Easter Sunday is on", easterday)
```



Carl Friedrich Gauss  
1777 - 1855



# The Holy Week

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## The week immediately before Easter Sunday

- Palm Sunday
- Holy Monday
- Fig Tuesday
- Spy Wednesday
- Maundy Thursday
- **Good Friday**
- Low Saturday
- **Easter Sunday**





## Good Friday

- Death of Jesus
- No Mass on that day (*but you still go to church*)
- Strict **fasting**
  - no eating
  - no joy
- Public holiday in many countries, including the Netherlands
  - but if you work for the government, you **still need to work**





# Preparations

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## Forty days of fasting

- Also known as **Lent**

*Then Jesus was led up by the Spirit into the wilderness to be tempted by the devil. He fasted **forty days and forty nights**, and afterwards he was famished.*

Matthew 4:1-2



## Forty days of fasting (but not on Sundays)

week	MONDAY	TUESDAY	WEDNESDAY	THURSDAY	FRIDAY	SATURDAY	SUNDAY
1	Shrove Monday	Shrove Tuesday / Pancake Day	1 Ash Wednesday	2	3	4	Lent Invocabit
2	5	6	7	8	9	10	Reminiscere
3	11	12	13	14	15	16	Oculi
4	17	18	19	20	21	22	Laetare / Mothering Sunday
5	23	24	25	26	27	28	Passiontide Passion Sunday
6	29	30	31	32	33	34	Holy Week Palm Sunday
7	35 Holy Monday	36 Holy Tuesday	37 Holy / Spy Wednesday	38 Holy / Maundy Thursday	39 Good Friday	40 Holy Saturday	Paschal Triduum Easter Sunday



## Ash Wednesday

- start of the fasting period
- **no meat** should be eaten

*By the sweat of your face you shall eat bread until you return to the ground, for out of it you were taken; **you are dust, and to dust you shall return.***

Genesis 3:19





**In the age of no  
freezers, what to do  
with all the meat  
before Lent?**

## Literally “carne levare” - “remove meat”

- celebrated dominantly in the south and the east of the Netherlands



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# Aftermath

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## Easter Monday

- more celebrations
- **Easter Egg hunt**
- **Central Europe:** Easter whip (**consensual**)



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## Ascension Day

- Celebrates **Ascension of Jesus into Heaven**
- 39th day after Easter = **Thursday 6th week after Easter Sunday**

*After his suffering he presented himself alive to them by many convincing proofs, appearing to them **during forty days** and speaking about the kingdom of God.*

Acts 1:3



## Pentecost

- Also known as Whit Sunday/Monday
- Descent of the Holy Spirit
- End of Easter
- **Celebrated for two days**

Week	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
0							<b>1</b> Easter Sunday
1	<b>2</b> Easter Monday	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>
2	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>
3	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>	<b>21</b>	<b>22</b>
4	<b>23</b>	<b>24</b>	<b>25</b>	<b>26</b>	<b>27</b>	<b>28</b>	<b>29</b>
5	<b>30</b>	<b>31</b>	<b>32</b>	<b>33</b>	<b>34</b>	<b>35</b>	<b>36</b>
6	<b>37</b>	<b>38</b>	<b>39</b>	<b>40</b> Ascension Day	<b>41</b>	<b>42</b>	<b>43</b>
7	<b>44</b>	<b>45</b>	<b>46</b>	<b>47</b>	<b>48</b>	<b>49</b>	<b>50</b> Pentecost
8	<b>51</b> Pentecost						

**RIPE Meeting typically here**



# The impact of Easter

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## Public holidays in the Netherlands

- New Year's Day (1/1)
- King's Day (27/4)
- *Liberation Day* (5/5)
- Christmas Day (25/12)
- Boxing Day (26/12)
- Good Friday (ES - 2)
- *Easter Sunday* (ES)
- Easter Monday (ES + 1)
- Ascension Day (ES + 39)
- *Whit Sunday* (ES + 49)
- Whit Monday (ES + 50)



# No time for Questions & Comments



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