1.Fetch all the paintings which are not displayed on any museums?

```
select * from work where museum_id is null;
```

2. Are there museuems without any paintings?

```
select * from museum m
where not exists (select 1 from work w
                                    where w.museum_id=m.museum_id)
```

#3. How many paintings have an asking price of more than their regular price?

```
select * from product_size
where sale_price > regular_price;
```

#4.Identify the paintings whose asking price is less than 50% of its regular price

```
select *
from product_size
where sale_price < (regular_price*0.5);
```

#5. Which canva size costs the most?

```
select cs.label as canva, ps.sale_price
from (select *
        , rank() over(order by sale_price desc) as rnk
        from product_size) ps
join canvas_size cs on cs.size_id::text=ps.size_id
where ps.rnk=1;
```

#6. Delete duplicate records from work, product_size, subject and image_link tables

```
delete from work
where ctid not in (select min(ctid)
                                    from work
                                    group by work_id );

delete from product_size
where ctid not in (select min(ctid)
                                    from product_size
                                    group by work_id, size_id );

delete from subject
where ctid not in (select min(ctid)
                                    from subject
```

```
                                        group by work_id, subject );

    delete from image_link
    where ctid not in (select min(ctid)
                                        from image_link
                                        group by work_id );
```

#7. Identify the museums with invalid city information in the given dataset

```
    select * from museum
    where city ~ '^[0-9]'
```

#8. Museum_Hours table has 1 invalid entry. Identify it and remove it.

```
    delete from museum_hours
    where ctid not in (select min(ctid)
                                        from museum_hours
                                        group by museum_id, day );
```

#9. Fetch the top 10 most famous painting subject

```
    select *
    from (
            select s.subject,count(1) as no_of_paintings
            ,rank() over(order by count(1) desc) as ranking
            from work w
            join subject s on s.work_id=w.work_id
            group by s.subject ) x
    where ranking <= 10;
```

#10. Identify the museums which are open on both Sunday and Monday. Display museum name, city.

```
    select distinct m.name as museum_name, m.city, m.state,m.country
    from museum_hours mh
    join museum m on m.museum_id=mh.museum_id
    where day='Sunday'
    and exists (select 1 from museum_hours mh2
                            where mh2.museum_id=mh.museum_id
                    and mh2.day='Monday');
```

#11. How many museums are open every single day?

```
    select count(1)
```

```
from (select museum_id, count(1)
        from museum_hours
        group by museum_id
        having count(1) = 7) x;
```

#12. Which are the top 5 most popular museum? (Popularity is defined based on most no of paintings in a museum)

```
select m.name as museum, m.city,m.country,x.no_of_painintgs
from (  select m.museum_id, count(1) as no_of_painintgs
                , rank() over(order by count(1) desc) as rnk
                from work w
                join museum m on m.museum_id=w.museum_id
                group by m.museum_id) x
join museum m on m.museum_id=x.museum_id
where x.rnk<=5;
```

#13. Who are the top 5 most popular artist? (Popularity is defined based on most no of paintings done by an artist)

```
select a.full_name as artist, a.nationality,x.no_of_painintgs
from (  select a.artist_id, count(1) as no_of_painintgs
                , rank() over(order by count(1) desc) as rnk
                from work w
                join artist a on a.artist_id=w.artist_id
                group by a.artist_id) x
join artist a on a.artist_id=x.artist_id
where x.rnk<=5;
```

#14. Display the 3 least popular canva sizes

```
select label,ranking,no_of_paintings
from (
        select cs.size_id,cs.label,count(1) as no_of_paintings
        , dense_rank() over(order by count(1) ) as ranking
        from work w
        join product_size ps on ps.work_id=w.work_id
        join canvas_size cs on cs.size_id::text = ps.size_id
        group by cs.size_id,cs.label) x
where x.ranking<=3;
```

#15. Which museum is open for the longest during a day. Dispay museum name, state and hours open and which day?

```
	select museum_name,state as city,day, open, close, duration
	from (  select m.name as museum_name, m.state, day, open, close
			, to_timestamp(open,'HH:MI AM')
			, to_timestamp(close,'HH:MI PM')
			, to_timestamp(close,'HH:MI PM') - to_timestamp(open,'HH:MI AM') as
duration
			, rank() over (order by (to_timestamp(close,'HH:MI PM') -
to_timestamp(open,'HH:MI AM')) desc) as rnk
			from museum_hours mh
			join museum m on m.museum_id=mh.museum_id) x
	where x.rnk=1;


#16. Which museum has the most no of most popular painting style?
	with pop_style as
			(select style
			,rank() over(order by count(1) desc) as rnk
			from work
			group by style),
		cte as
			(select w.museum_id,m.name as museum_name,ps.style, count(1)
as no_of_paintings
			,rank() over(order by count(1) desc) as rnk
			from work w
			join museum m on m.museum_id=w.museum_id
			join pop_style ps on ps.style = w.style
			where w.museum_id is not null
			and ps.rnk=1
			group by w.museum_id, m.name,ps.style)
	select museum_name,style,no_of_paintings
	from cte
	where rnk=1;


#17. Identify the artists whose paintings are displayed in multiple countries
	with cte as
		(select distinct a.full_name as artist
		--, w.name as painting, m.name as museum
		, m.country
		from work w
		join artist a on a.artist_id=w.artist_id
		join museum m on m.museum_id=w.museum_id)
	select artist,count(1) as no_of_countries
	from cte
```

```
group by artist
having count(1)>1
order by 2 desc;
```

#18. Display the country and the city with most no of museums. Output 2 seperate columns to mention the city and country. If there are multiple value, seperate them with comma.

```
with cte_country as
        (select country, count(1)
        , rank() over(order by count(1) desc) as rnk
        from museum
        group by country),
    cte_city as
        (select city, count(1)
        , rank() over(order by count(1) desc) as rnk
        from museum
        group by city)
select string_agg(distinct country.country,', '), string_agg(city.city,', ')
from cte_country country
cross join cte_city city
where country.rnk = 1
and city.rnk = 1;
```

#19. Identify the artist and the museum where the most expensive and least expensive painting is placed.
Display the artist name, sale_price, painting name, museum name, museum city and canvas label

```
with cte as
    (select *
    , rank() over(order by sale_price desc) as rnk
    , rank() over(order by sale_price ) as rnk_asc
    from product_size )
select w.name as painting
, cte.sale_price
, a.full_name as artist
, m.name as museum, m.city
, cz.label as canvas
from cte
join work w on w.work_id=cte.work_id
join museum m on m.museum_id=w.museum_id
join artist a on a.artist_id=w.artist_id
join canvas_size cz on cz.size_id = cte.size_id::NUMERIC
```

```
where rnk=1 or rnk_asc=1;
```

#20. Which country has the 5th highest no of paintings?

```
with cte as
        (select m.country, count(1) as no_of_Paintings
        , rank() over(order by count(1) desc) as rnk
        from work w
        join museum m on m.museum_id=w.museum_id
        group by m.country)
select country, no_of_Paintings
from cte
where rnk=5;
```

#21. Which are the 3 most popular and 3 least popular painting styles?

```
with cte as
        (select style, count(1) as cnt
        , rank() over(order by count(1) desc) rnk
        , count(1) over() as no_of_records
        from work
        where style is not null
        group by style)
select style
, case when rnk <=3 then 'Most Popular' else 'Least Popular' end as remarks
from cte
where rnk <=3
or rnk > no_of_records - 3;
```

#22. Which artist has the most no of Portraits paintings outside USA?. Display artist name, no of paintings and the artist nationality.

```
select full_name as artist_name, nationality, no_of_paintings
from (
        select a.full_name, a.nationality
        ,count(1) as no_of_paintings
        ,rank() over(order by count(1) desc) as rnk
        from work w
        join artist a on a.artist_id=w.artist_id
        join subject s on s.work_id=w.work_id
        join museum m on m.museum_id=w.museum_id
        where s.subject='Portraits'
        and m.country != 'USA'
        group by a.full_name, a.nationality) x
```

```
where rnk=1;
```