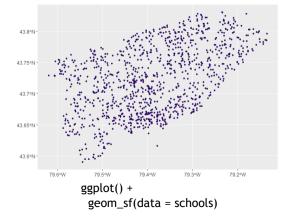
# Spatial manipulation with sf:: cheat sheet

The sf package provides a set of tools for working with geospatial vectors, i.e. points, lines, polygons, etc.



#### Geometric confirmation

- st\_contains(x, y, ...) Identifies if x is within y (i.e. point within polygon)
- st\_covered\_by(x, y, ...) Identifies if x is completely within y (i.e. polygon completely within polygon)
- st\_covers(x, y, ...) Identifies if any point fromx is outside of y (i.e. polygon outside polygon)
- st\_crosses(x, y, ...) Identifies if any geometry of x have commonalities with y
- st\_disjoint(x, y, ...) Identifies when geometries from x do not share space with y
- st\_equals(x, y, ...) Identifies if x and y share the same geometry
- st\_intersects(x, y, ...) Identifies if x and y geometry share any space
- st\_overlaps(x, y, ...) Identifies if geometries of x and y share space, are of the same dimension, but are not completely contained by each other
- st\_touches(x, y, ...) Identifies if geometries of x and y share a common point but their interiors do not intersect
- st\_within(x, y, ...) Identifies if x is in a specifieddistance to y



### Geometric operations

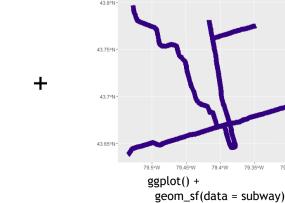
- st\_boundary(x) Creates a polygon thatencompasses the full extent of the geometry
- st\_buffer(x, dist, nQuadSegs) Creates a polygon covering all points of the geometry within a given distance
- st\_centroid(x, ..., of\_largest\_polygon)
  Creates a point at the geometric centre of the geometry
- st\_convex\_hull(x) Creates geometry that represents the minimum convex geometry of x
- st\_line\_merge(x) Creates linestring geometry from sewing multi linestring geometry together
- st\_node(x) Creates nodes on overlapping geometry where nodes do not exist
- st\_point\_on\_surface(x) Creates a point that is guarenteed to fall on the surface of the geometry
- st\_polygonize(x) Creates polygon geometry from linestring geometry
- st\_segmentize(x, dfMaxLength, ...) Creates

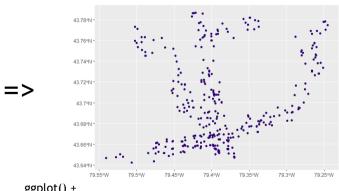
  linesting geometry from x based on a specified length
- st\_simplify(x, preserveTopology, dTolerance)
  Creates a simplified version of the geometry based on a specified tolerance

## Geometry creation

- st\_voronoi(x, envelope, dTolerance, bOnlyEdges)

  Creates polygon geometry covering the envolope of x, with x at the centre of the geometry
- st\_point(x, c(numeric vector), dim = "XYZ")
  Creating point geometry from numeric values
- st\_multipoint(x = matrix(numeric values in rows), dim = "XYZ") Creating multi point geometry from numeric values
- st\_linestring(x = matrix(numeric values in rows), dim = "XYZ") Creating linestring geometry from numeric values
- st\_multilinestring(x = list(numeric matricesin rows), dim = "XYZ") Creating multi linestring geometry from numeric values
- st\_polygon(x = list(numeric matrices in rows),
  dim = "XYZ") Creating polygon geometry from
  numeric values
- st\_multipolygon(x = list(numeric matrices in rows), dim = "XYZ") Creating multi polygon geometry from numeric values





geom\_sf(data = st\_intersection(schools, st\_buffer(subway, 1000)))

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## Geometry operations

- st\_contains(x, y, ...) Identifies if x is within y (i.e. point within polygon)
- st\_crop(x, y, ..., xmin, ymin, xmax, ymax) Creates geometry of x that intersects a specified rectangle
- st\_difference(x, y) Creates geometry from x that does not intersect with y
- st\_intersection(x, y) Creates geometry of the shared portion of x and y
- st\_sym\_difference(x, y) Creates geometry
  representing portions of x and y that do not intersect
- st\_snap(x, y, tolerance) Snap nodes from geometry x to geometry y
- st\_union(x, y, ..., by\_feature) Creates multiple

  >> \sum \text{geometries into a a single geometry, consisiting of all geometry elements

### Geometric measurement

- st\_area(x) Calculate the surface area of a polygon
  geometry based on the current coordinate reference system
- **st\_distance**(x, y, ..., dist\_fun, by\_element, which)
  Calculates the 2D distance between x and y based on the current coordinate system
- **st\_length**(x) Calculates the 2D length of a geometry based on the current coordinate system

## Misc operations

- **st\_as\_sf**(x, ...) Create a sf object from a non-geospatial tabular data frame
- st\_cast(x, to, ...) Change x geometry to a different
  geometry type
- st\_coordinates(x, ...) Creates a matrix of coordinate values
  from x
- $st\_crs(x, ...)$  Identifies the coordinate reference system of x
- **st\_join**(x, y, join, FUN, suffix, ...) Performs a spatial left or inner join between x and y
- **st\_make\_grid**(x, cellsize, offset, n, crs, what) Creates rectangular grid geometry over the bounding box of x
- st\_nearest\_feature(x, y) Creates an index of the closest
  feature between x and y
- $st_nearest_points(x, y, ...)$  Returns the closest point between x and y
- st\_read(dsn, layer, ...) Read file or database vector
  dataset as a sf object
- st\_transform(x, crs, ...) Convert coordinates of x to a
  different coordinate reference system

