Question 1

a.

```
db.createCollection("widgetSales")

db.widgetSales.insertMany([{ date: new ISODate("2018-12-01"), quantity: 2, unitPrice: new NumberDecimal("60") }, { date: new ISODate("2018-12-02"), quantity: 5, unitPrice: new NumberDecimal("90") }, { date: new ISODate("2018-12-02"), quantity: 10, unitPrice: new NumberDecimal("200") }, { date: new ISODate("2018-12-04"), quantity: 20, unitPrice: new NumberDecimal("80") }, { date: new ISODate("2018-12-04"), quantity: 1, unitPrice: new NumberDecimal("16") }, { date: new ISODate("2018-12-05"), quantity: 3, unitPrice: new NumberDecimal("60") }, { date: new ISODate("2019-01-25"), quantity: 2,unitPrice: new NumberDecimal("60") }, { date: new ISODate("2019-01-25"), quantity: 1, unitPrice: new NumberDecimal("16") }, { date: new ISODate("2019-01-26"), quantity: 5, unitPrice: new NumberDecimal("100") }, { date: new ISODate("2019-01-26"), quantity: 12,unitPrice: new NumberDecimal("48") }, { date: new ISODate("2019-01-26"), quantity: 2, unitPrice: new NumberDecimal("36") }, { date: new ISODate("2019-01-26"), quantity: 5,unitPrice: new NumberDecimal("100") }, { date: new ISODate("2019-01-27"), quantity: 1,unitPrice: new NumberDecimal("20") }, { date: new ISODate("2019-01-27"), quantity: 5, unitPrice: new NumberDecimal("80") }, { date: new ISODate("2019-01-27"), quantity: 3, unitPrice: new NumberDecimal("12") }, { date: new ISODate("2019-01-27"), quantity: 12,unitPrice: new NumberDecimal("48") }, { date: new ISODate("2019-01-27"), quantity: 5, unitPrice: new NumberDecimal("36") }, { date: new ISODate("2019-01-27"), quantity: 5, unitPrice: new NumberDecimal("100") }])
```

b. db.widgetSales.find().limit(3)

```
Atlas atlas-mhfbmb-shard-0 [primary] hw3> db.widgetSales.find().limit(3)
[
  {
    _id: ObjectId('661822d1ce534b7701e43b22'),
    date: ISODate('2018-12-01T00:00:00.000Z'),
    quantity: 2,
    unitPrice: Decimal128('60')
  },
  {
    _id: ObjectId('661822d1ce534b7701e43b23'),
    date: ISODate('2018-12-02T00:00:00.000Z'),
    quantity: 5,
    unitPrice: Decimal128('90')
  },
  {
    _id: ObjectId('661822d1ce534b7701e43b24'),
    date: ISODate('2018-12-02T00:00:00.000Z'),
    quantity: 10,
    unitPrice: Decimal128('200')
  }
]
Atlas atlas-mhfbmb-shard-0 [primary] hw3>
```

c. Creating the collection:

- db.widgetSales.aggregate([{$group: {_id: { $dateToString:{format: "%Y-%m", date: "$date"}}, totalSales:{$sum:{$multiply:["$unitPrice", "$quantity"]}}}},{$merge:{into: "widgetSalesMonthlyAgg"}}])

- show collections

```
Atlas atlas-mhfbmb-shard-0 [primary] hw3> show collections
customerorder
widgetSales
widgetSalesMonthlyAgg
Atlas atlas-mhfbmb-shard-0 [primary] hw3>
```

- db.widgetSalesMonthlyAgg.find()

```
Atlas atlas-mhfbmb-shard-0 [primary] hw3> db.widgetSalesMonthlyAgg.find()
[
  { _id: '2018-12', totalSales: Decimal128('4366') },
  { _id: '2019-01', totalSales: Decimal128('3496') }
]
Atlas atlas-mhfbmb-shard-0 [primary] hw3>
```

Question 2

a. db.orders.find({productName:"Steel beam"}, {productName:1, status:1, _id:0})

b. db.orders.createIndex({productName:1, status:1})

c. db.orders.getIndexes()

```
Atlas atlas-mhfbmb-shard-0 [primary] Lecture5> db.orders.getIndexes()
[
  { v: 2, key: { _id: 1 }, name: '_id_' },
  { v: 2, key: { productName: 1 }, name: 'productName_1' },
  {
    v: 2,
    key: { productName: 1, quantity: 1 },
    name: 'productName_1_quantity_1'
  },
  {
    v: 2,
    key: { productName: 1, status: 1 },
    name: 'productName_1_status_1'
  }
]
Atlas atlas-mhfbmb-shard-0 [primary] Lecture5>
```

d. The index size of productName_1_status_1 is 20480 bytes.

e. This index will be the fastest because it is a covered query. The query is only using the index and does not go through any documents, making it the most efficient way to run the query.

Question 3

a.

```
db.createCollection("customerorder")

db.customerorder.insertMany([{customerId: "red@gmail.com", customerName: "Alfredo Norris", order: []}, {customerId: "orange@gmail.com", customerName: "Kimberly Hanna", order: [{ orderId: 1000, orderDate: new ISODate("2020-09-01")}]},{customerId: "yellow@gmail.com", customerName: "Lisa Patrick", order: [{ orderId: 1000, orderDate: new ISODate("2020-09-03") },{ orderId: 1001, orderDate: new ISODate("2020-09-10") }]},{customerId: "green@gmail.com", customerName: "Cindy Palmer", order: [{ orderId: 1002, orderDate: new ISODate("2020-09-15") }, { orderId: 1003, orderDate: new ISODate("2020-09-20") },{ orderId: 1004, orderDate: new ISODate("2020-09-30") }]}])
```

b.

```
db.customerorder.find({customerName: "Lisa Patrick"}, {_id:0, customerId:0, customerName:0})
```

c.

```
db.customorder.aggregate([{$unwind: "$order" }, {$group: {_id: "$customerId", orderId: {$min:"$order.orderId" }, orderDate: { $min:"$order.orderDate"}}}])
```