```
from sklearn.datasets import fetch_openml

mnist = fetch_openml('mnist_784', version=1, as_frame=False)
X = mnist.data
y = mnist.target
```

```
/usr/local/lib/python3.9/dist-packages/sklearn/datasets/_openml.py:968: FutureWarning: The default value of `parser` will change from `
  warn(
/usr/local/lib/python3.9/dist-packages/sklearn/datasets/_openml.py:65: RuntimeWarning: Invalid cache, redownloading file
  warn("Invalid cache, redownloading file", RuntimeWarning)
/usr/local/lib/python3.9/dist-packages/sklearn/datasets/_openml.py:100: UserWarning: A network error occurred while downloading https:/
  warn(
```

```
from sklearn.model_selection import train_test_split

X_train, X_test, y_train, y_test = train_test_split(X, y, train_size=50000, random_state=42)
X_test, X_val, y_test, y_val = train_test_split(X_test, y_test, train_size=10000, random_state=42)
```

```
from sklearn.metrics import accuracy_score
from sklearn.ensemble import RandomForestClassifier

rnd_clf = RandomForestClassifier(n_estimators=500, max_leaf_nodes=32, random_state=42)
rnd_clf.fit(X_train, y_train)

y_val_pred = rnd_clf.predict(X_val)
accuracy_score(y_val, y_val_pred)
```

```
0.8694
```

```
from sklearn.ensemble import ExtraTreesClassifier

ext_clf = ExtraTreesClassifier(n_estimators=500, max_leaf_nodes=32, random_state=42)
ext_clf.fit(X_train, y_train)

y_val_pred = ext_clf.predict(X_val)
accuracy_score(y_val, y_val_pred)
```

```
0.8596
```

```
from sklearn.svm import LinearSVC

svm_clf = LinearSVC(max_iter=100, tol=20, random_state=42)
svm_clf.fit(X_train, y_train)

y_val_pred = svm_clf.predict(X_val)
accuracy_score(y_val, y_val_pred)
```

```
0.8777
```

```
from sklearn.ensemble import VotingClassifier

voting_clf = VotingClassifier(
    estimators=[('rf', rnd_clf), ('et', ext_clf), ('svc', svm_clf)]
)
voting_clf.fit(X_train, y_train)

voting_clf.score(X_val, y_val)
```

```
0.8771
```

```
voting_clf.score(X_test, y_test)
```

```
0.8751
```

✓ 2s completed at 2:10 AM