Assignment 12

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Exercise 1

   i. 70000
  ii. 28x28
 iii. 10 classes
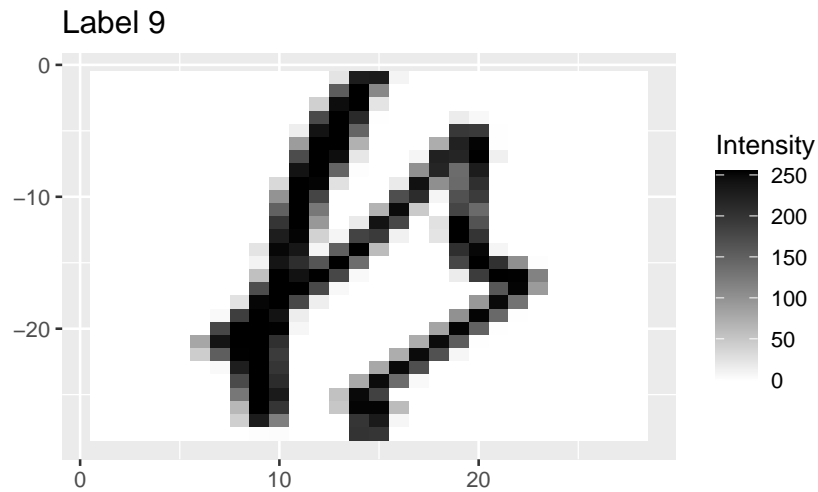
Exercise 2

```r
train_dl <- dataloader(
  dataset = train_ds,
  batch_size = 32,
  shuffle = TRUE
)
```

Exercise 3

```
## [1]  32 784
```

Exercise 4

-The image corresponds to the character "re."-

Label 9

Exercise 5

```r
valid_dl <- dataloader(
  dataset = valid_ds,
  batch_size = 32,
  shuffle = FALSE
)

test_dl <- dataloader(
  dataset = test_ds,
  batch_size = 32,
  shuffle = FALSE
)
```

Exercise 6

```r
net <- nn_module(
  initialize = function() {
    self$fc1 <- nn_linear(784, 128)
    self$fc2 <- nn_linear(128, 10)
  },
  forward = function(x) {
    x %>%
      self$fc1() %>%
      nnf_relu() %>%
      self$fc2()
  }
)
```

Exercise 7

```r
model1 <- setup(
  net,
  loss = nn_cross_entropy_loss(),
  optimizer = optim_adam,
  metrics = list(luz_metric_accuracy())
)
```

Exercise 8

```
## Epoch 1/5
## Train metrics: Loss: 1.7791 - Acc: 0.498
## Valid metrics: Loss: 1.2179 - Acc: 0.6934
## Epoch 2/5
## Train metrics: Loss: 1.0243 - Acc: 0.7334
## Valid metrics: Loss: 0.7945 - Acc: 0.7988
## Epoch 3/5
## Train metrics: Loss: 0.735 - Acc: 0.7998
## Valid metrics: Loss: 0.6014 - Acc: 0.8457
## Epoch 4/5
## Train metrics: Loss: 0.5771 - Acc: 0.8506
## Valid metrics: Loss: 0.4803 - Acc: 0.8828
## Epoch 5/5
## Train metrics: Loss: 0.4688 - Acc: 0.8828
## Valid metrics: Loss: 0.386 - Acc: 0.9102
```

Exercise 9

Exercise 10