[Self] Chapter 14 Mini Quiz (Mini Quiz Lec09) [ALL CORRECT]

```
format short
xtest1 = 1.1
```

```
xtest1 =
1.1000
```

```
xtest2 = 1.5
```

```
xtest2 =
1.5000
```

```
xtest3 = 45
```

```
xtest3 =
45
```

Exponential

1) Fitting the following data with the exponential model.

x = [0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0]

y = [0.5 0.7 0.7 0.6 0.9 0.8 1.3 1.6 1.9 2.3 2.4]

Find α and β

And find the prediction of y when x = 1.1

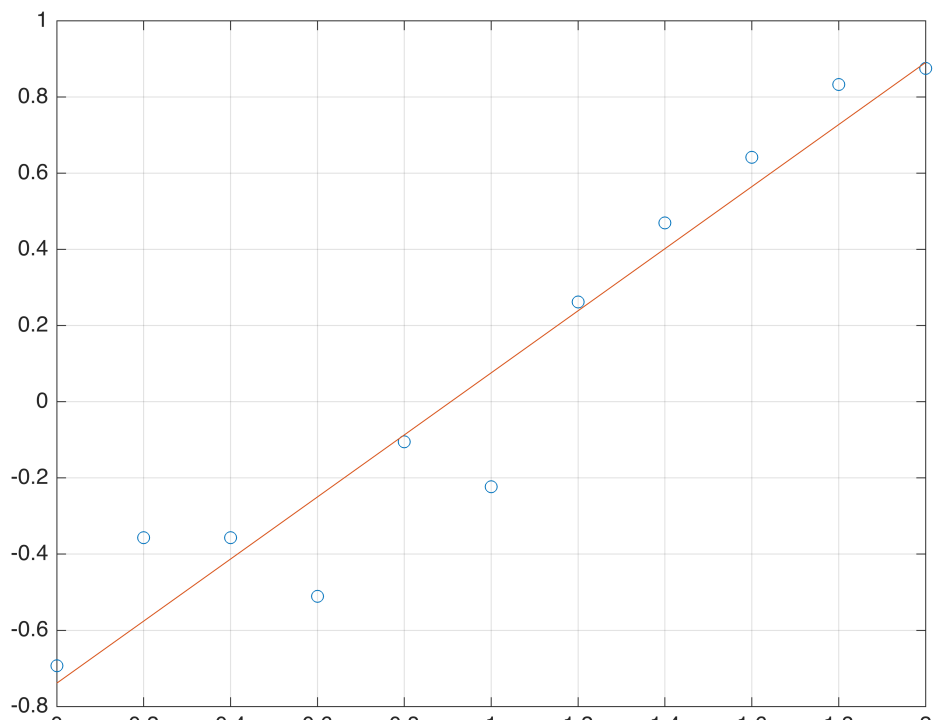
Rounding a decimal number to four decimal places.

α =

β =

x = 1.1, y =

```
x = [0 0.2 0.4 0.6 0.8 1.0 1.2 1.4 1.6 1.8 2.0];
y = [0.5 0.7 0.7 0.6 0.9 0.8 1.3 1.6 1.9 2.3 2.4];
x_exp = x;
y_exp = log(y);
[ae, ~] = linregr(x_exp, y_exp)
```




```
ae = 1×2
    0.8148   -0.7388
```

```
alphae = exp(ae(2))
```

```
alphae =
0.4777
```

```
betae = ae(1)
```

```
betae =
0.8148
```

```
yprede = alphae .* exp(betae .* xtest1)
```

```
yprede =
1.1706
```

Power

2) Fitting the following data with the power model.

x = [1.0000 1.2000 1.4000 1.6000 1.8000 2.0000 2.2000 2.4000 2.6000 2.8000 3.0000]

y = [3.2888 7.6111 11.9175 22.3415 35.8022 33.2350 71.6824 43.5441 90.5842 74.6333 94.7754]

Find α and β

And find the prediction of y when x = 1.5

Rounding a decimal number to four decimal places.

α =

β =

x = 1.5, y =

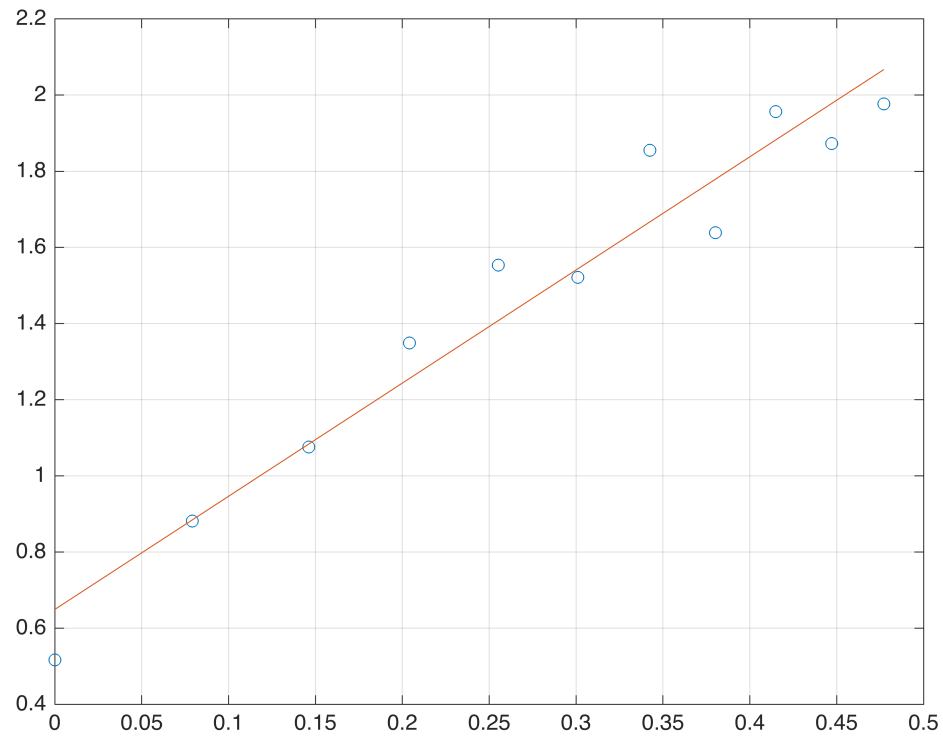
```
x = [1.0000 1.2000 1.4000 1.6000 1.8000 2.0000 2.2000 2.4000 2.6000 2.8000 3.0000];
y = [3.2888 7.6111 11.9175 22.3415 35.8022 33.2350 71.6824 43.5441  90.5842 74.6333  94.7754];
x_pow = log10(x)
```

```
x_pow = 1×11
         0    0.0792    0.1461    0.2041    0.2553    0.3010    0.3424    0.3802 ···
```

```
y_pow = log10(y)
```

```
y_pow = 1×11
    0.5170    0.8814    1.0762    1.3491    1.5539    1.5216    1.8554    1.6389 ···
```

```
[ap, ~] = linregr(x_pow, y_pow)
```




```
ap = 1×2
    2.9712    0.6496
```

```
alphap = 10^ap(2)
```

```
alphap =
4.4625
```

```
betap = ap(1)
```

```
betap =
2.9712
```

```
ypredp = alphap .* (xtest2 .^ betap)
```

```
ypredp =
14.8858
```

Saturation

3) Fitting the following data with the saturation-growth-rate model.

x = [10 20 30 40 50 60 70 80 90 100]

y = [0.18 0.29 0.32 0.39 0.40 0.41 0.43 0.47 0.47 0.47]

Find α and β

And find the prediction of y when x = 45

Rounding a decimal number to four decimal places.

α =

β =

X = 45, y =

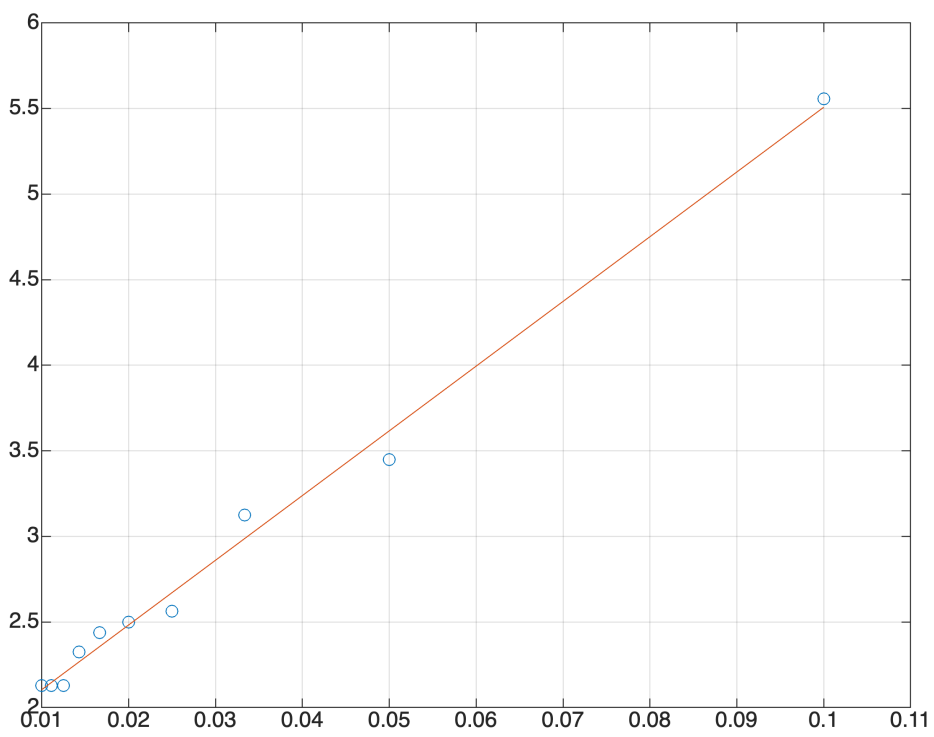
```
x = [10 20 30 40 50 60 70 80 90 100];
y = [0.18 0.29 0.32 0.39 0.40 0.41 0.43 0.47 0.47 0.47];
x_sat = 1 ./ x
```

```
x_sat = 1×10
    0.1000    0.0500    0.0333    0.0250    0.0200    0.0167    0.0143    0.0125 ···
```

```
y_sat = 1 ./ y
```

```
y_sat = 1×10
    5.5556    3.4483    3.1250    2.5641    2.5000    2.4390    2.3256    2.1277 ···
```

```
[as, ~] = linregr(x_sat, y_sat)
```




```
as = 1×2
   37.8012    1.7269
```

```
alphas = 1 / as(2)
```

```
alphas =
0.5791
```

```
betas = as(1) * alphas
```

```
betas =
21.8901
```

```
ypreds = alphas .* (xtest3 ./ (betas + xtest3))
```

```
ypreds =
0.3896
```