**Answer Key**

1. A graph with dots and lines

   Description automatically generated Fit the following models and create scatter plots with regression lines for each of them. Record their R2 values and comment on the linearity.
   * 1. Linearity:

Strong linearity.

```{r}

mod\_3 <- lm(Rank4 ~ Rank1, data = ski\_speeds)

summary(mod\_3)

plot(Rank4 ~ Rank1, data = ski\_speeds)

abline(mod\_3)

```

* + 1. A graph with dots and numbers

       Description automatically generatedR2: 83.7%
    2. Linearity:

Linear but the slight s-curve shape could cause issues.

```{r}

mod\_1 <- lm(Rank4 ~ Time1, data = ski\_speeds)

summary(mod\_1)

plot(Rank4 ~ Time1, data = ski\_speeds)

abline(mod\_1)

```

* + 1. A graph with dots and numbers

       Description automatically generatedR2: 77.7%
    2. Linearity:

Strong linearity.

```{r}

mod\_2 <- lm(Time4 ~ Time1, data = ski\_speeds)

summary(mod\_2)

plot(Time4 ~ Time1, data = ski\_speeds

abline(mod\_2)

```

* + 1. R2: 85.8%
    2. A graph with dots and lines

       Description automatically generatedLinearity:

Linear but the clear s-curve shape could cause issues.

```{r}

mod\_4 <- lm(Time4 ~ Rank1, data = ski\_speeds)

summary(mod\_4)

plot(Time4 ~ Rank1, data = ski\_speeds)

abline(mod\_4)

```

* + 1. R2: 81.9%

1. Interpret the slope coefficient for the best of these models to predict Rank4. Remember to contextualize.

For every additional place in Rank1, Rank4 increases by about 0.88 places.

```{r}

summary(mod\_3)

```

1. If a skier is ranked #14 after the first split, what rank would you predict for her finish?

The predicted Rank4 for a skier with a Rank1of 14, is 15.25 which can be rounded to 15th place at the finish.

```{r}

mod\_3 <- lm(Rank4 ~ Rank1, data = ski\_speeds)

summary(mod\_3)

Rank1 <- 14

Rank4 <- 2.95897 + 0.87807\*Rank1

Rank4

```

1. Interpret the slope coefficient for the best of these models to predict Time4. Remember to contextualize.

For every additional minute Time1 increases, Time4 increases by about 4.66 minutes.

```{r}

summary(mod\_2)

```

1. If a skier had a time of 5.00 minutes after the first split, what time would you predict for her finish?

The predicted Time4 for a skier with a Time1 of 5 minutes is 30.07 minutes.

```{r}

mod\_2 <- lm(Time4 ~ Time1, data = ski\_speeds)

summary(mod\_2)

Time1 <- 5

Time4 <- 6.7561 + 4.6618\*Time1

Time4

```