Warm Up

1.) The graph of a linear function is a **vertical** line. When \( x = -3 \) and \( y = 4 \), what is the equation for the linear function? \( x = -3 \)

2.) Solve for \( x \):

\[
5(x-3) - 2(x+1) = 4
\]

\[
5x - 15 - 2x - 2 = 4
\]

\[
3x - 17 = 4
\]

\[
+17 +17
\]

\[
3x = 21
\]

\[
\frac{3x}{3} = \frac{21}{3}
\]

\[
x = 7
\]

3.) Simplify:

\[
[(-5 + 1) ÷ 2]^2 - |-7|
\]

\[
[-4 ÷ 2]^2 - 7
\]

\[
[-2]^2 - 7
\]

\[
4 - 7
\]

\[
-3
\]
# Linear Equations Word Problems

## Type 1: Slope-Intercept

### Notes:
Use when given a rate of change and a starting point

### Problem 1:
Evan is going to the county fair this weekend. The admission to the fair is $5 and the cost per ride is $0.50. If his parents gave him $20, write and solve a linear equation to find how many rides he can go on.

\[
y = mx + b
\]

\[
y = 0.50x + 5
\]

\[
y = 20 = 0.50x + 5
\]

\[
15 = 0.50x
\]

\[
x = 30 \text{ rides}
\]

### Problem 2:
While visiting Crimson Lake, Sally decided to go kayaking. The rangers charge $8.50 per hour in addition to a $25.00 deposit to rent the kayak. If she rented the kayak from 11:30 a.m. to 2:30 p.m., write and solve a linear equation to find the total cost to rent the kayak.

\[
y = mx + b
\]

\[
y = 8.50x + 25
\]

\[
y = 8.50(3) + 25
\]

\[
y = \$50.50
\]
5. Sam ordered two hamburgers and three hotdogs from the concession stand at the baseball game. His bill came to $19.05. If hamburgers cost $5.25 each, write and solve a linear equation to find the cost of each hot dog.

\[ 2x + 3y = 19.05 \]
\[ 2(5.25) + 3y = 19.05 \]
\[ 10.50 + 3y = 19.05 \]
\[ -10.50 \quad -10.50 \]
\[ 3y = 8.55 \]
\[ \frac{3y}{3} = \frac{8.55}{3} \]
\[ y = \$2.85 \]

x = cost per hamburger
y = cost per hotdog

6. Tickets at a school play cost $4 in advance or $5 at the door. Total ticket sales for an evening production were $440. If no tickets were sold in advance, write and solve a linear equation to find the how many were sold at the door.

x = number of advance tickets
y = number of at the door tickets

\[ 4x + 5y = 440 \]
\[ 4(0) + 5y = 440 \]
\[ 5y = 440 \]
\[ \frac{5y}{5} = \frac{440}{5} \]
\[ y = 88 \]
9. At Eagle Bay, it costs $12 per hour to rent a canoe. Nate and his friends rented a canoe for 4 hours and paid $68. Write and solve a linear equation to find the cost to rent the canoe for 7 hours.

\[ Y - 68 = 12(X - 4) \]
\[ Y - 68 = 12X - 48 \]
\[ Y = 12X + 20 \]

The flat fee to rent the canoe is $20.

10. A construction company charges $18 per hour for debris removal, plus a one-time fee for the use of the trash dumpster. The total fee for 8 hours of service was $219. Write and solve a linear equation to find the one-time fee for the trash dumpster.

\[ m = 18 \]
\[ (8, 219) \]

\[ y - 219 = 18(x - 8) \]
\[ y = 18x + 75 \]

The one-time fee for the dumpster is $75.
Slope --> Point Slope

13. To surf the internet for 15 minutes at an airport, it costs $4.05. For 40 minutes, it costs $5.80. Write and solve a linear equation to find the cost for surfing the web for one hour.

\[
\begin{align*}
\text{m} &= \frac{5.80 - 4.05}{40 - 15} \\
&= 0.07 \\

y - 4.05 &= 0.07(x - 15) \\
y - 4.05 &= 0.07x - 1.05 \\
+4.05 &= 0.07x + 3 \\
y &= 0.07x + 3
\end{align*}
\]

It costs 7 cents per minute to surf the internet. The initial fee to surf the internet is $3.00. The cost to surf the internet for one hour is $7.20.

14. Water boils at 100° Celsius or 212° Fahrenheit. Water freezes at 0° Celsius or 32° Fahrenheit. If the weather forecaster says it will be 25° Celsius today, write and solve a linear equation to find what Fahrenheit temperature this is.