Transcontinental Railroad – Math Skills

Problems	Answers
Approximately **1 in 10 Chinese workers** died from the cold or accidents. **If you have frostbite and are losing fingers and toes at the same ratio, how many would you lose?**	
One Mile of track contained how many of the following items? $$14,000 \times 2$$ $$\begin{array}{llll} & & 7,000 & +\ \ 100 \\ 202 & 1,750 & 5,250 & \\ +\ 150 & \times\ \ \ 2 & +\ 1,750 & +\ \ \ 60 \\ \text{Rails} & \text{Ties} & \text{Nuts \&} & \text{Spikes} \\ & & \text{Bolts} & \end{array}$$	
The Pacific Railway Act of _____ (**one thousand eight hundred and sixty four**) allowed the railroad companies to issue their own bonds and doubles the land grants.	
3 x 5 = _____ **tunnels** were built between Sacramento, California and Promontory Summit, Utah.	
Only **99 – 4 + 5 – 96 =** _____ **tunnels** were built between Omaha, Nebraska and Promontory Summit, Utah.	
The East Tunnel, built by the Union Pacific, was **772 feet long** and used **1, 064 kegs** of black powder to create. **On average how many kegs per foot were used?**	
3 x 10 = _____ **+ 3 + 4 =** _____ **snow sheds** were built to help keep snow off the tracks.	
Summit Tunnel took **two years** to complete. It was **1,659 feet long.** **On average how many feet were completed each day?**	

The railroads overlapped for **80 miles** before a spot was chosen by Congress to meet. **At the rate of pay of $32,000 per mile how much would a company lose if their overlapping track was not used?**	
The Union Pacific laid **922 miles of track** from Omaha, Nebraska to Promontory Summit, Utah. **If the lowest rate ($16,000 per mile) for level land east of the Rockies is used, what is the minimum amount the Union Pacific should have paid?**	
The golden spike and special laurel tie were immediately removed and replaced by normal ones after the press show. **The last spike was made of 88 ÷ 5 = _____ carat gold and weighed 109 x 4 = _____ grams.**	
A gold nugget on the end of the spike made rings for President Ulysses S. Grant, Secretary of State William Seward, and Governor Stanford. **If each ring contains a least 4 grams of gold, what was the minimum weight of the gold nugget?**	
The Central Pacific Railroad paid the voyage from China to California for imported workers; but the workers had to pay the company back out of their wages. A voyage was **$40 by steamship** and **$35 by sailboat**. **Approximately how long would it take a Chinese worker to pay back each voyage with a wage of $35 per month?** (*Assume there are 30 days in a month*)	
The rails had to lay exactly **56 inches apart**. This is _____ **feet** and _____ **inches**	
Fishplates are metal plates that bolt together to hold the ends of rails together. **How many fishplates would be needed for one mile of track?** (*Note: One fishplate is needed to bind two rails together*)	
The message "Done" was sent out by telegraph nationwide to announce the completion of the Transcontinental Railroad. **How many times did the messenger have to tap the telegraph transmitter to send the message to the awaiting public?** The Morris Code for DONE is: **-.. --- -. .**	

Transcontinental Railroad – Math Skills – Answer Key

1. Approximately **1 in 10** Chinese workers died from the cold or accidents. **If you have frostbite and are losing fingers and toes at the same ratio, how many would you lose?**

2 fingers or toes lost

2. One Mile of track contained how many of the following items?

$$
\begin{array}{r}
14{,}000 \\
\times \quad 2 \\
\hline
\end{array}
$$

$$
\begin{array}{cccc}
 & & 7{,}000 & +\quad 100 \\
202 & 1{,}750 & 5{,}250 & \\
+\,150 & \times\quad 2 & +\,1{,}750 & +\quad 60 \\
\hline
\textbf{352 Rails} & \textbf{2{,}500 Ties} & \textbf{14{,}000} \text{ Nuts \&} & \textbf{28{,}160} \text{ Spikes} \\
 & & \textbf{Bolts} &
\end{array}
$$

3. The Pacific Railway Act of ___1864___ (**one thousand eight hundred and sixty four**) allowed the railroad companies to issue their own bonds and doubles the land grants.

4. **3 x 5 =** ___15___ **tunnels** were built between Sacramento, California and Promontory Summit, Utah.

5. Only **99 – 4 + 5 – 96 =** __4__ **tunnels** were built between Omaha, Nebraska and Promontory Summit, Utah.

6. The East Tunnel, built by the Union Pacific, was **772 feet long** and used **1, 064 kegs** of black powder to create. **On average how many kegs per foot were used?**

722 ÷ 1064 = .73 kegs used

7. **3 x 10 =** ___30___ **+ 3 + 4 =** ___37___ **snow sheds** were built to help keep snow off the tracks.

8. Summit Tunnel took **two years** to complete. It was **1,659 feet long. On average how many feet were completed each day?**

1,659 ÷ 730 = 2.28 feet completed each day

9. The railroads overlapped for **80 miles** before a spot was chosen by Congress to meet. **At the rate of pay of $32,000 per mile how much would a company lose if their overlapping track was not used?**

$32,000 x 80 = $2,560,000 lost

10. The Union Pacific laid **922 miles of track** from Omaha, Nebraska to Promontory Summit, Utah. **If the lowest rate ($16,000 per mile) for level land east of the Rockies is used, what is the minimum amount the Union Pacific should have paid?**

922 x $16,000 = $15,872,000 paid

11. The golden spike and special laurel tie were immediately removed and replaced by normal ones after the press show. **The last spike was made of 88 ÷ 5 = _17.6_ carat gold and weighed 109 x 4 = _436_ grams.**

12. A gold nugget on the end of the spike made rings for President Ulysses S. Grant, Secretary of State William Seward, and Governor Stanford. **If each ring contains a least 4 grams of gold, what was the minimum weight of the gold nugget?**

12 oz for three rings

13. The Central Pacific Railroad paid the voyage from China to California for imported workers; but the workers had to pay the company back out of their wages. A voyage was **$40 by steamship** and **$35 by sailboat**. **Approximately how long would it take a Chinese worker to pay back each voyage with a wage of $35 per month?** (*Assume there are 30 days in a month*)

$\frac{35}{30}$ x $\frac{35}{X}$ = 30 days $\frac{35}{30}$ x $\frac{40}{X}$ = 34.3 days

14. The rails had to lay exactly **56 inches apart**. This is __4__ **feet** and __8__ **inches**

15. Fishplates are metal plates that bolt together to hold the ends of rails together. **How many fishplates would be needed for one mile of track?** (*Note: One fishplate is needed to bind two rails together*)

352 rails ÷ 2 (1 fishplate for 2 rails) = 176 fishplates

16. The message "Done" was sent out by telegraph nationwide to announce the completion of the Transcontinental Railroad. **How many times did the messenger have to tap the telegraph transmitter to send the message to the awaiting public?**

The Morris Code for DONE is: **-..   ---   -.   .**

7 times