Show all work to receive full credit. You may use a calculator. CHECK YOUR WORK!!!!

Solve the following equations for the unknown. (6 pts each)

1. \(-9b - 9 = 7 + 4b + 6b\)
   \[-9b - 9 = 10b + 7\]
   \[-9b - 9 = 10b + 7\]
   \[-19b = 16\]
   \[b = \frac{-16}{19}\]

2. \(2(2x - 2) = 3(x + 3)\)
   \[4x - 4 = 3x + 9\]
   \[-3x = 13\]
   \[x = \frac{13}{3}\]

3. \(-(5y + 4) - (-4y - 2) = -9\)
   \[-5y - 4 + 4y + 2 = -9\]
   \[-y - 2 = -9\]
   \[y = 7\]

4. \(-3x + 6(-2x + 5) = -40 - 5x\)
   \[-3x - 12x + 30 = -40 - 5x\]
   \[-15x + 30 = -45\]
   \[-10x = -75\]
   \[x = 7.5\]

5. \(\frac{1}{15} \cdot d = \frac{7}{30}\)
   \[d = \frac{7}{2} \cdot \frac{15}{30}\]
   \[d = \frac{7}{2}\]

6. \(\frac{1}{3} s - \frac{1}{4} = 2\)
   \[12(\frac{1}{3}) - 12(\frac{1}{4}) = 2(12)\]
   \[4s - 3s = 24\]
   \[s = 24\]

7. \(-(6x + 2) - (8x - 3) = 8 - (5x + 1)\)
   \[-14x + 1 = 7 - 5x\]
   \[9x + 1 = 7\]
   \[9x = 6\]
   \[x = \frac{2}{3}\]

8. \(\frac{5x - 4}{3} = \frac{7x + 4}{4}\)
   \[4(5x - 4) = 3(7x + 4)\]
   \[20x - 16 = 21x + 12\]
   \[-20x\]
   \[16 = x + 12\]
   \[-12 = x + 12\]
   \[x = -24\]
(8 pts each) For the next two problems (9 & 10), translate the following sentences into equations and solve for the unknowns:

9. The difference between two positive integers is 32. One integer is three times as great as the other. Find the integers.

\[ \begin{align*}
\text{Let } x &= 1\text{st integer} \\
3x &= 2\text{nd integer} \\
3x - x &= 32 \\
2x &= 32 \\
x &= 16
\end{align*} \]

\[ 3(16) = 48 \]

\[ \{16, 48\} \]

10. If three times the smaller of two consecutive integers is added to four times the larger, the result is 46. Find the two integers.

\[ \begin{align*}
\text{Let } x &= 1\text{st integer} \\
4(x+1) &= 2x + 46 \\
7x + 4 &= 46 \\
7x &= 42 \\
x &= 6
\end{align*} \]

\[ \{6, 7\} \]

11. (8 pts) If a boat uses 20 gallons of gas to go 64 miles, how many miles can the boat travel on 100 gallons of gas?

\[ \frac{20}{64} = \frac{100}{x} \]

\[ x = 320 \text{ miles} \]

12. (8 pts) Which is the best buy for apple juice? (show your work and reasoning)

\[ \begin{align*}
\text{32-oz bottle: } &\$2.69 \quad 2.69/32 = 0.0841 \\
\text{48-oz bottle: } &\$3.29 \quad 3.29/48 = 0.0685 \\
\text{64-oz bottle: } &\$4.49 \quad 4.49/64 = 0.0702
\end{align*} \]

48 oz bottle
For problems 13, 14, & 15, solve each inequality and graph the solution set. Write your solutions using interval notation also.

13. (6 pts) \(-5x \leq 25\)
   \[
   -5x \leq 25 \\
   \frac{-5x}{5} \leq \frac{25}{5} \\
   x \geq -5
   \]

14. (6 pts) \(-9x - 27 \leq -3(2x + 6)\)
   \[
   -9x - 27 \leq -6x - 18 \\
   +9x \quad \quad +9x \\
   -27 \leq 3x - 18 \\
   +18 \quad \quad +18 \\
   -9 \leq 3x \\
   \frac{-9}{3} \leq \frac{3x}{3} \\
   -3 \leq x
   \]

15. (8 pts) \(7 \leq 5t - 3 \leq 27\)
   \[
   7 \leq 5t - 3 \leq 27 \\
   +3 \quad +3 \quad +3 \\
   10 \leq 5t \leq 30 \\
   \frac{10}{5} \leq \frac{5t}{5} \leq \frac{30}{5} \\
   2 \leq t \leq 6
   \]

**BONUS** (total of 10 extra points)

Solve for the indicated variable: \(C = \frac{5}{9}(F - 32)\) for \(F\).
\[
C = \frac{5}{9}(F - 32) \\
\frac{9}{5} C = (\frac{9}{5} \cdot \frac{5}{9})(F - 32) \\
\frac{9}{5} C = F - 32 \\
\frac{9}{5} + 32 = F
\]

\[
\frac{9}{5} C + 32 = F
\]