

Math 70
Exam 2 Solutions

1. To find the temperature in degrees Fahrenheit, evaluate the formula with $C = 25$.

$$F = \frac{9}{5}(25) + 32 = 45 + 32 = 77$$

Note: $\frac{9}{5}(25) = \frac{9}{5} \cdot \frac{25}{1} = \frac{225}{5} = 45$ or you can simplify the numerator and denominators before multiplying the fractions.

So, the temperature is $\boxed{77^\circ \text{ Fahrenheit.}}$

2. (a) Distribution with the inner set of parenthesis: $3x[2x + 4(x - 1)] = 3x[2x + 4x - 4]$

You can distribute the $3x$ into the brackets or you can combine like terms inside the brackets. I will be combining like terms first:

$$\begin{aligned}\Rightarrow 3x[2x + 4x - 4] &= 3x[6x - 4] \\ &= 3x(6x) - 3x(4) \\ &= \boxed{18x^2 - 12x}\end{aligned}$$

(b) Distribution on both sets of parenthesis: $2x(6x + 3) - (x + 7) = 12x^2 + 6x - x - 7$
 $= \boxed{12x^2 + 5x - 7}$

(c) Using the product rule for exponents: $y^7 \cdot y^6 = y^{7+6} = \boxed{y^{13}}$.

(d) $(3a^3b^6)(10a^5b^2)(-b) = -30a^{3+5}b^{6+2+1}$
 $= \boxed{-30a^8b^9}$

3. (a) Simplifying the right-side of the equation: $5 + x = -3 \Rightarrow x = -8$ (Subtracting 5 from both sides)

Solution: $\boxed{x = -8}$

Check: Left-side of equation: $-8 + 5 = -3$

Right-side of equation: $-12 + 9 = -3 \checkmark$

(b) Dividing both sides by 6: $x = \frac{1.2}{6} = 0.2$

Solution: $\boxed{x = 0.2}$

Check: Left-side of equation: $6(0.2) = 1.2$

Right-side of equation: $1.2 \checkmark$

(c) Combining like terms on the left-side of the equation:

$$\begin{aligned}4y + 2 &= 32 \\4y &= 30 \\ \Rightarrow y &= \frac{30}{4} = \frac{15}{2} \quad (\text{Dividing both sides by 4 and simplifying})\end{aligned}$$

Solution: $\boxed{y = \frac{15}{2} \text{ or } 7.5}$

Check: Left-side of equation: $\frac{15}{2} + 3\left(\frac{15}{2}\right) + 2 = \frac{15}{2} + \frac{45}{2} + 2 = \frac{60}{2} + 2 = 32$
Right-side of equation: $32 \checkmark$

(d) Distributing the left-side of the equation:

$$\begin{aligned}5x - 5(2) &= 2x + 2 \\5x - 10 &= 2x + 2 \\3x - 10 &= 2 \quad (\text{Subtracting } 2x \text{ from each side.}) \\3x &= 12 \quad (\text{Adding 10 to each side.}) \\x &= 4 \quad (\text{Dividing both sides by 3.})\end{aligned}$$

Solution: $\boxed{x = 4}$

Check: Left-side of equation: $5(4 - 2) = 5(2) = 10$
Right-side of equation: $2(4) + 2 = 8 + 2 = 10 \checkmark$

(e) Here are a couple of ways to solve this:

- $\frac{x}{6} = 1 - \frac{4}{3}$ (Subtracting $\frac{4}{3}$ from each side.)
 $\frac{x}{6} = \frac{3}{3} - \frac{4}{3} \Rightarrow \frac{x}{6} = -\frac{1}{3}$
 $\Rightarrow x = 6\left(-\frac{1}{3}\right)$ (Multiplying both sides by 6.)
 $\Rightarrow x = -2$

- Clearing the fractions:

The LCD of the denominators 6 and 3 is 6. Multiplying both sides by 6:

$$6\left(\frac{x}{6} + \frac{4}{3}\right) = 6(1)$$

$$6\left(\frac{x}{6}\right) + 6\left(\frac{4}{3}\right) = 6$$

$$x + 8 = 6 \quad \text{since } 6\left(\frac{4}{3}\right) = 8.$$

$$x = -2 \quad (\text{Subtracting 8 from both sides.})$$

Solution: $\boxed{x = -2}$

Check: Left-side of equation: $\frac{-2}{6} + \frac{4}{3} = \frac{-2}{6} + \frac{8}{6} = \frac{6}{6} = 1$
Right-side of equation: $1 \checkmark$

4. Subtracting $4x$ from both sides: $3y = 6 - 4x$

Dividing both sides by 3: $y = \frac{6}{3} - \frac{4x}{3}$

Simplifying: $y = 2 - \frac{4x}{3}$

5. **Unknowns:**

Time it takes for the person and the squirrel to be 75 feet apart = t

(Note: Since the person travels at a speed of 20 ft/sec for t seconds, the distance traveled by the person is $20t$. Similarly, the squirrel travels $10t$.)

Equation: The distance between the person and the squirrel is the same as the distance traveled by the person added to the distance traveled by the squirrel. So the equation is

$$20t + 10t = 75 \Rightarrow 30t = 75$$

Dividing both sides by 30: $t = \frac{75}{30} = \frac{5}{2}$ or 2.5

It takes 2.5 seconds for the person and the squirrel to be 75 feet apart.

6. **Unknowns:**

Length of first piece = x Length of second piece = $2x$ Length of third piece = $x + 12$

Equation: All three lengths need to sum up to 64, so the equation is

$$\begin{aligned} x + 2x + x + 12 = 64 &\Rightarrow 4x + 12 = 64 \\ &\Rightarrow 4x = 52 \quad (\text{Subtracting 12 from both sides}) \\ &\Rightarrow x = 13 \quad (\text{Dividing both sides by 4}) \end{aligned}$$

The first piece needs to be 13 inches, the second piece needs to be 26 inches, and the third needs to be 25 in.