

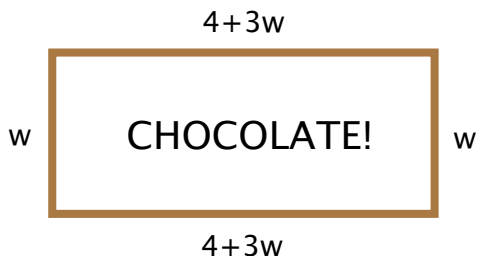
Math 70
Final Exam Solutions

1. (a) $\frac{3}{4} \cdot \frac{5}{6} = \frac{15}{24} = \frac{5}{8}$
- (b) $\frac{3}{4} + \frac{5}{6} = \frac{9}{12} + \frac{10}{12} = \frac{19}{12}$ or $1\frac{7}{12}$ (Least Common Denominator: 12)
- (c) $\frac{3}{4} \div \frac{5}{6} = \frac{3}{4} \cdot \frac{6}{5} = \frac{18}{20} = \frac{9}{10}$
- (d) $-4.4 - 1.38 = -5.78$ since $4.4 + 1.38 = 5.78$
- (e) Note the order of operations:
- | | |
|-------------------------------|---------------------------------------|
| $5 - 2(7 - 4)^2 = 5 - 2(3)^2$ | (Operations inside parenthesis first) |
| $= 5 - 2(9)$ | (Exponents) |
| $= 5 - 18$ | (Multiplication) |
| $= -13$ | (Subtraction) |

2. Gas Mileage = $157.2 \div 6 = 26.2$

So, the gas mileage is 26.2 miles per gallon.

3. Here's a diagram with variables.



Unknowns: Width = w

Length = $4 + 3w$

Equation: $(w) + (w) + (4 + 3w) + (4 + 3w) = 40$ (Perimeter = Sum of all sides)

$$\begin{aligned} \Rightarrow 8w + 8 &= 40 && \text{(Combining like terms)} \\ 8w &= 32 && \text{(Subtracting 8 from both sides)} \\ w &= 4 && \text{(Dividing both sides by 8)} \end{aligned}$$

So, the width of the chocolate bar is 4 feet and the length is $4 + 3(4) = 16$ feet.

4. (a) $5x - 5.1 = 3x - 2.3 \Rightarrow 2x - 5.1 = -2.3$ (Subtracting $3x$ from both sides)
- $2x = 2.8$ (Adding 5.1 to both sides)
- $x = 1.4$ (Dividing both sides by 2)

Note that $-2.3 + 5.1 = 2.8$ since $5.1 - 2.3 = 2.8$.

Check: Left-side of equation: $5(1.4) - 5.1 = 7 - 5.1 = 1.9$

Right-side of equation: $3(1.4) - 2.3 = 4.2 - 2.3 = 1.9 \checkmark$

$$\begin{aligned} \text{(b)} \quad y + 2y + 7 = 1 & \quad \Rightarrow \quad 3y + 7 = 1 & \quad \text{(Combining like terms on the left-side)} \\ & \quad \quad \quad 3y = -6 & \quad \text{(Subtracting 7 from both sides)} \\ & \quad \quad \quad y = -2 & \quad \text{(Dividing both sides by 3)} \end{aligned}$$

Check: Left-side of equation: $-2 + 2(-2) + 7 = -2 - 4 + 7 = 1$

Right-side of equation: $1 \checkmark$

5. The tax on the hybrid car will be $22,000(0.08) = 1760$ dollars.

So, the total bill will be $22,000 + 1760 = 23,760$ dollars.

$$6. \quad \text{(a)} \quad 2^{-3} = \frac{1}{2^3} = \frac{1}{2 \cdot 2 \cdot 2} = \frac{1}{8}$$

$$\text{(b)} \quad (4x^3)^2 = 4^2(x^3)^2 = 16x^6$$

$$\text{(c)} \quad \frac{12y}{3y^5} = \frac{12}{3} \cdot \frac{y}{y^5} = \frac{4}{1} \cdot \frac{1}{y^4} = \frac{4}{y^4}$$

7. Moving the decimal in 4.498 by 9 digits to the right: Distance = 4,498,000,000 kilometers

$$\begin{aligned} 8. \quad \text{(a)} \quad (3x^2 - 2x) - (-x^2 + 5x) &= (3x^2 - 2x) + (x^2 - 5x) && \text{(Changing the problem into} \\ & \quad \quad \quad \text{addition by changing the signs of the 2nd polynomial)} \\ &= 3x^2 + x^2 - 2x - 5x \\ &= 4x^2 - 7x && \text{(Combining like terms)} \end{aligned}$$

$$\begin{aligned} \text{(b)} \quad (x + 3)(x - 5) &= x^2 - 5x + 3x - 15 && \text{(FOIL)} \\ &= x^2 - 2x - 15 && \text{(Combining like terms)} \end{aligned}$$

$$\begin{aligned} \text{(c)} \quad 2x(x^2 + 3x - 8) + x^2 &= 2x(x^2) + 2x(3x) - 2x(8) + x^2 && \text{(Distributing } 2x) \\ &= 2x^3 + 6x^2 - 16x + x^2 \\ &= 2x^3 + 7x^2 - 16x && \text{(Combining like terms)} \end{aligned}$$

9. The area of the sail is $A = \frac{1}{2}(8)(6) = \frac{1}{2}(48) = 24$ square feet.

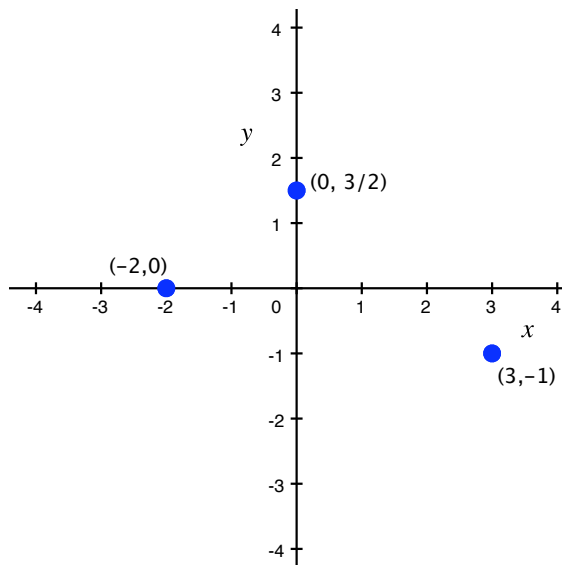
So, the total cost will be $24(2.50) = 60$ dollars.

10. For the point $(3, -1)$, move 3 units to the right and 1 unit down from the origin.

For the point $(-2, 0)$, move 2 units left from the origin.

For the point $(0, \frac{3}{2})$, move 1 and a half units up from the origin.

(Note: $\frac{3}{2} = 1\frac{1}{2}$ or 1.5)



11. (a) $(1, ?)$: $x = 1, y = ? \Rightarrow 4(1) + \frac{1}{2}y = 5$

$$4 + \frac{1}{2}y = 5$$

$$\frac{1}{2}y = 1$$

(Subtracting 4 from each side.)

$$y = 2$$

(Mult. both sides by 2 or div. by $\frac{1}{2}$)

So, the complete ordered pair is $(1, 2)$.

(b) $(?, 6)$: $x = ?, y = 6 \Rightarrow 4x + \frac{1}{2}(6) = 5$

$$4x + 3 = 5$$

$$4x = 2$$

(Subtracting 3 from each side.)

$$x = \frac{1}{2}$$

(Dividing both sides by 4)

So, the complete ordered pair is $(\frac{1}{2}, 6)$.