1. An object is thrown upward with an initial velocity of 29 feet per second from the top of a 573-foot building. The height of the object at any time \( t \) can be described by the polynomial function \( P(t) = -16t^2 + 29t + 573 \). Find the height of the object at \( t = 5 \) seconds.

2. If the cost, \( C(x) \), for manufacturing \( x \) units of a certain product is given by \( C(x) = x^2 - 10x + 9000 \), find the number of units manufactured at a cost of $13,200.

3. One number is 9 less than a second number. Twice the second number is 31 more than 3 times the first. Find the two numbers.

4. A twin-engined aircraft can fly 816 miles from city A to city B in 4 hours with the wind and make the return trip in 6 hours against the wind. What is the speed of the wind?

\[
\begin{array}{|c|c|c|c|}
\hline
& t & r & d \\
\hline
\text{With Wind} & \times & = & \\
\hline
\text{Against Wind} & \times & = & \\
\hline
\end{array}
\]
5. A retired couple has $190,000 to invest to obtain annual income. They want some of it invested in safe Certificates of Deposit yielding 7%. The rest they want to invest in AA bonds yielding 10% per year. How much should they invest in each to realize exactly $17,200 per year?

\[
P \times r \times t = I
\]

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6. A chemist has a 32% solution of alcohol to mix with a 74% solution to get 210 L of a final mixture that is 52% alcohol. How much of each of the original solutions should he use?

\[
\text{Number of liters} \times \text{Percent of solution} = \text{Amount of solution}
\]

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7. A sum of money amounting to $3.35 consists of dimes and quarters. If there are 20 coins in all, how many are quarters?

\[
\times =
\]

\[
\times =
\]
8–40, multiple Choice Problems–part II exam.

Solve the system of equations using either substitution or elimination.

8. \[
\begin{align*}
\frac{x}{4} - \frac{y}{2} &= 1 \\
\frac{x}{3} - y &= 2
\end{align*}
\]

9. \[
\begin{align*}
2x - 4y &= 5 \\
-8x + 16y &= -15
\end{align*}
\]

10. \[
\begin{align*}
6x + 6y &= -2 \\
12y &= -4 - 12x
\end{align*}
\]

11. \[
\begin{align*}
0.8x - 0.8y &= -4.8 \\
0.7x - 0.4y &= -3.6
\end{align*}
\]
Solve the system of three linear equations containing three unknowns.

12.
\[
\begin{align*}
5x + 2y + z &= -11 \\
2x - 3y - z &= 17 \\
7x + y + 2z &= -4
\end{align*}
\]

13.
\[
\begin{align*}
x + y + z &= 0 \\
x - y + 4z &= -21 \\
3x + 3y + 3z &= 4
\end{align*}
\]

14.
\[
\begin{align*}
3x + y - 4z &= -23 \\
-x - 2y + 2z &= 13 \\
5x + 5y - 8z &= -49
\end{align*}
\]
Factor the polynomial completely using the "u" substitution.

15. $2y^{10} - 7y^5 - 72$

Determine if the given ordered triple is a solution of the system of linear equations.

17. \[
\begin{align*}
5x + 2y + z &= 14 \\
4x - 3y - z &= -10 \\
5x + y + 5z &= 5
\end{align*}
\]
(1, 5, -1)

18. \[
\begin{align*}
3x + 3y + z &= -4 \\
2x - 3y - z &= -16 \\
4x + y + 5z &= -18
\end{align*}
\]
(-1, 3, -4)
Problems 16~17, determine if the given point satisfies the system.

19. \[ \begin{align*}
    x + y & \geq 5 \\
    -3x + y & \leq 12
\end{align*} \]
   \((9, -2)\)  

20. \[ \begin{align*}
    3x + 4y & < 14 \\
    -4x + 3y & > 14
\end{align*} \]
   \((4, -3)\)  

Graph the system of linear inequalities.

21. \[ \begin{align*}
    y & < 2x - 2 \\
    y & \leq \frac{3}{2}x
\end{align*} \]
Graph the system of linear inequalities. Tell whether the graph is bounded or unbounded.

22. \[
\begin{align*}
2x + 3y & \leq 6 \\
x - y & \leq 3 \\
y & \leq 2
\end{align*}
\]

Find the value of the polynomial function.

23. \[f(x) = -2x^2 + 7x + 8; \quad f(-4)\]

For the given functions \(f\) and \(g\), find the requested function.

24. \[f(x) = 8x - 5; \quad g(x) = 3x - 9\]
   Find \((f - g)(x)\).

25. \[f(x) = 3x^2 + 5x - 4; \quad g(x) = 6x + 6\]
   Find \((f + g)(-2)\).

Find the product.

26. \[10x^2y(-4x^2y^4 + 12xy^3 - 8)\]
Find the product of the two binomials.
27. \((5x + 8y)(2x + 9y)\) 

Find the product of the polynomials.
28. \((6y + 11)(8y^2 - 2y - 3)\)

Find the requested value for the given functions.
29. \(f(x) = x + 1, \ g(x) = x^2 - 11x - 2\)

Find \((f \cdot g)(x)\) and \((f \cdot g)(-5)\).

Divide using long division.
30. \(\frac{15x^3 + 11x^2 + 13x - 3}{5x - 3}\)

Divide using synthetic division.
31. \(\frac{5m^3 + 31m^2 - 20m + 56}{m + 7}\)

Find \(\left(\frac{f}{g}\right)(x)\).
32. \(f(x) = 15x^3 + 23x^2 + 24x + 5; \ g(x) = -5x - 1\)
Find the requested value.

33. $g(x) = 4x - 2$; $f(x) = 4x^2 + 14x + 5$
   Find $\frac{f}{g}(-4)$.

Use the Remainder Theorem to find the remainder.

34. $f(x) = 5x^4 + 11x^3 + 3x^2 - 8x + 17$ is divided by $x - 3$

Factor the polynomial completely. If the polynomial cannot be factored, say it is prime.

35. $7x^2 + 32x - 15$

36. $12x^3 + 11x^2 - 15x$

37. $24x^3y + 34x^2y + 12xy$
Solve the equation.

38. \( \frac{5x^2 - 18}{3} = -9x \)

39. \( x^2 + 6x = x(x - 8) \)

40. \( y^3 - y = -2y^2 + 2 \)