1. \[ \left( (3x-1)^\frac{1}{3} \right)^5 = (2)^5 \]
   \[3x-1 = 32\]
   \[x = 11\]

2. \[\frac{5(73) + 5(x)}{10} = 81\]
   \[365 + 5x = 810\]
   \[x = 89\]

3. Given: \[P(x) = ax^3 + bx^2 + cx + d\]

   Since \(P(0) = -24\), \(d = -24\).

   The product of the roots is 24, so
   \[-\frac{d}{a} = 24\], and so \(a = 1\).

   The sum of the roots is \(-5\), so
   \[-\frac{b}{a} = -5\quad \rightarrow \quad b = 5a\], and so \(b = 5\).

   The sum of the product of the roots, taken two at a time, is
   \((-3)(-4) + (-3)(2) + (-4)(2) = -2\), so
   \[-\frac{c}{a} = -2\], and \(c = -2\).

   \[P(x) = x^3 + 5x^2 - 2x - 24.\]

   \[P(-1) = -18\]

4. \[AC = \begin{bmatrix} 1 & 5 \\ 5 & 6 \end{bmatrix} = \begin{bmatrix} -24 & 26 \\ -25 & 35 \end{bmatrix}\]
   \[CB = \begin{bmatrix} 1 & 1 \\ -5 & 6 \end{bmatrix} = \begin{bmatrix} -5 & 11 \\ 25 & -5 \end{bmatrix}\]
   \[AC - CB = \begin{bmatrix} -19 & 15 \\ -50 & 41 \end{bmatrix}\]
   \[x + y = -35\]

5. \[\sum_{k=5}^{9} (2k + 3) = 13 + 15 + 17 + 19 + 21 = 85\]

   \[x^2 + 4x + 4 = -8y - 8\]

6. \[(x + 2)^2 = -8(y + 1)\]

   The vertex is \((-2, -1)\), and the length of the latus rectum is \(-\frac{8}{4} = 2\). Because the parabola opens down, the focus is at \((-2, -3)\).

7. Using synthetic division, \(-1\) divides through twice with no remainder.

8. \[\log 4x + 3(\log x - \log y)\]
   \[\log 4x + 3\log \frac{x}{y}\]
   \[\log 4x + \log \frac{x^3}{y^3}\]
   \[\log \frac{4x^4}{y^3}\]

9. Multiply by 3 four more times, or just multiply by 81. \[\frac{54}{5} (81) = \frac{4374}{5}\].

10. \[(7i^2)(-8i)^2 + (5i^5)(-4i) + \left(\frac{\sqrt{441}}{i^2}\right) \left(\frac{\sqrt{-9}}{i}\right)\]
    \[(-7)(-64) + (5i)(-4i) + (-21)(3)\]
    \[448 + 20 - 63\]
    \[405\]

11. The number of permutations of 3 people from a group of 7 is \(\frac{7!}{4!} = 210\).
12. Cost (c) varies inversely with people (p).
\[ c = \frac{k}{p} \]
\[ 26 = \frac{k}{63}, \text{ so } k = 1638. \]
\[ c = \frac{1638}{72} = 22.75 \]

13. (-6,-3) and (-3,-10)
\[ m = \frac{-10 - (-3)}{-3 - (-6)} = \frac{-7}{3} \]
\[ y = mx + b \]
\[ -10 = \frac{-7}{3}(-3) + b \]
\[ b = 17 \]
\[ \frac{b}{m} = \frac{51}{7} \]

14. \( x = (1+3i) \)
\( x - 1 = 3i \)
\( (x-1)^2 = (3i)^2 \)
\( x^2 - 2x + 1 = -9 \)
\( x^2 - 2x + 10 = 0 \)
\( 2B + C = -4 + 10 = 6 \)

15. \( 5\sqrt{27} + 6\sqrt{5} - 4\sqrt{48} \)
\( 15\sqrt{3} + 6\sqrt{5} - 16\sqrt{3} \)
\( 5\sqrt{3} \)

16. \( g(f(-1)) = g(9) = 241 \)
\( \frac{x^2 - 16x + 64}{10x} = \frac{(x-8)^2}{10x} \cdot \frac{2x}{x-8} = \frac{x-8}{5} \)

18. \( \frac{1}{9^{4x}} = 27^{(8-2x)} \)
\( 3^{-8x} = 3^{24-6x} \)
\( -8x = 24 - 6x \)
\( x = -12 \)

19. \( (x-3)^2 + (y+1)^2 = 16 \)
Finding where \( y = 0 \):
\( (x-3)^2 + (1)^2 = 16 \)
\( x^2 - 6x + 9 + 1 = 16 \)
\( x^2 - 6x = 0 \)
\( x = 3 \pm \sqrt{15} \)
\( x = 3 + \sqrt{15} \)

20. \( (3x + 5)(1x - 2) \), and \( BC = 5 \).  

21. Using substitution, find the solution is the point \((-5,2,3)\), and \( z-x = 8 \).

22. \( 3(2^{n-1}) \)

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24. \( \frac{x-3}{4x} - \frac{-2x-2}{9} = -\frac{29}{36} \)
\( 9x - 27 + 8x^2 - 8x = -29x \)
\( 8x^2 + 30x - 27 = 0 \)
\( -30 \pm \sqrt{300 - 4(8)(-27)} \)
\( 16 \)
\( -30 \pm 42 \)
\( 16 \)
\( \frac{3}{4} \)
\( 9 \)
\( \frac{4}{2} \)
The least is \(-9/2\).
25. \[ \frac{2x - 2}{x - 25} \geq \frac{1}{x + 5} \]

25 and -5 are critical points.

Solving for additional critical points:

\[ 2x^2 + 8x - 10 = x - 25 \]

Testing the discriminant, there are no real solutions and no additional critical points.

Testing intervals, the solution set is

\((-\infty, -5) \cup [25, \infty)\)

The greatest integer not in the solution set is 24.