1. ) Using the quadratic formula:
\[ x = \frac{-6 \pm \sqrt{36 - 52}}{2} \]
\[ x = \frac{6 \pm \sqrt{-16}}{2} \]
\[ x = 3 \pm 2i \]
Choice C

2.) Find the mean between the 7 scores:
\[ 2x + 390 = 80 \]
\[ 2x = 170 \]
\[ x = 85 \]
Choice E

3.) Using the definition of the absolute value:
\[ x^2 + x - 1 = 1 \quad x^2 + x - 1 = -1 \]
\[ x^2 + x - 2 = 0 \quad x^2 + x = 0 \]
\[ x = -2 \text{ or } 1 \quad x = -1 \text{ or } 0 \]
Sum of solutions: -2+1+1+0=-2
Choice A

4.) Squaring both sides of the equation:
\[ (\sqrt{10 + 3\sqrt{x}})^2 = (\sqrt{x})^2 \]
\[ (3\sqrt{x})^2 = (x - 10)^2 \]
\[ x^2 - 29x + 100 = 0 \]
\[ x = 4 \text{ or } 25 \]
But x=4 is an extraneous root, so the answer is 25 only.
Choice C

5.) Cross multiplying:
\[ 5x + 25 = 6x - 9 \]
\[ x = 34 \]
Choice D

6.) Using the definition of the absolute value twice:
\[ 3x - |2x + 1| = 4 \]
\[ |2x + 1| = 3x - 4 \]
\[ 2x + 1 = 3x - 4 \quad 2x + 1 = -3x + 4 \]
\[ x = 5 \quad x = \frac{3}{5} \]
\[ 3x - |2x + 1| = -4 \]
\[ |2x + 1| = 3x - 4 \]
\[ 2x + 1 = 3x - 4 \quad 2x + 1 = -3x - 4 \]
\[ x = -3 \quad x = -1 \]
Choice C

7.) Using the discriminant:
\[ 25 - 4 \cdot 3 \cdot -8 \]
\[ 25 + 96 \]
\[ 121 \]
Choice D

8.) Since \( 0 < a < b \):
\[ \left(\sqrt{a} - \sqrt{b}\right)^2 \geq 0 \]
\[ a - 2\sqrt{ab} + b \geq 0 \]
\[ \frac{a + b}{2} \geq \sqrt{ab} \]
Choice B

9.) Multiply by 2:
\[ 0 < 3x + 2 < 8 \]
\[ -2 < 3x < 6 \]
\[ -\frac{2}{3} < x < 2 \]
Choice C

10.) Multiply by 2x - 4
\[ 0 < 1 < x - 2 \]
\[ 3 < x \]
Choice B

11.) Getting a LCD:
\[ 5 + 3x + 9 = 8 + x \]
\[ x = -3 \]
Since -3 is not in the domain, there is no solution
Choice B

12.) Using the discriminant:
\[ k^2 - 16 = 0 \]
\[ k = -4 \text{ or } 4 \]
Choice D

13.) Getting a LCD:
\[ bx + ax = abc \]
\[ x(a + b) = abc \]
\[ x = \frac{abc}{a + b} \]
Choice E

14.) Using rules for exponents:
\[ x^2 + 4x - 12 = 0 \]
\[ x = -6 \text{ or } 2 \]
Choice A
15.) Using rules for logarithms:
\[ x^2 - y^2 = 1, \quad x^2 + y^2 = 1 \]
\[ 2x^2 = 2, \quad x = \pm 1 \]
but \( x = -1 \) does not work, so only one solution \((x, y) = (1, 0)\) works.
Choice B

16.) Getting a LCD:
\[
\begin{align*}
2(y-4)(y+6) + 3(y+3)(y+6) &= 5(y+3)(y-4) \\
2y^2 + 4y - 48 + 3y^2 + 27y + 54 &= 5y^2 - 5y - 60 \\
y &= -11/6
\end{align*}
\]
Choice A

17.) Let \( y = (3x + 4) \)
\[
\begin{align*}
y^2 - 6y + 9 &= 0 \\
y &= 3 \\
x &= -\sqrt{3}/3
\end{align*}
\]
Choice B

18.) If an inequality is greater than or equal to a negative number, then there are an infinite number of solutions.
Choice E

19.) To have 2 distinct real solutions, the discriminant must be greater than 0.
\[
121 - 4 \cdot 1 \cdot p > 0, \quad -4p > -121, \quad p < \frac{121}{4}
\]
The largest integer less than \( \frac{121}{4} \) is 30.
Choice: C

20.) Using properties of exponents:
\[
\ln 8 = 2x + 5 \\
x = \frac{\ln 8 - 5}{2}
\]
Choice B

21.) The absolute value of 3 is 3.
\[ x = 3 \]
Choice C

22.) Simplifying:
\[
x^2 - 1 > x^2 + x - 12 \\
x < 11
\]
Choice D

23.) Setting up a system of equations:
\[
x + y = 18 \\
y = \frac{2\sqrt{3}}{3}x \\
\frac{5}{3}x = 18 \\
x = 10.8 \\
y = 7.2
\]
Choice C

24.) Factoring the expression gives \( rs \left( r^2 + s^2 \right) \). So we want the product of (the product of the roots and the sum of the squares of the roots).
\[
rs = \frac{c}{a} = \frac{1}{3} \quad \text{and} \\
r^2 + s^2 = \frac{b^2 - 2ac}{a^2} = \frac{49 - 2 \cdot 3 \cdot 1}{9} = \frac{43}{9}.
\]
The product of \( \frac{1}{3} \) and \( \frac{43}{9} \) is \( \frac{43}{27} \).
Choice D

25.) Using properties of logarithms:
\[ 8 = 2x + 1 \]
\[ x = \frac{7}{2} \]
Choice E

26.) Let \( y = x^{3/5} \)
\[
3y^5 + 5y - 2 = 0 \\
y = -2 \quad \text{or} \quad \frac{1}{3} \\
x = \pm 2\sqrt{2} \quad \text{or} \quad \pm \frac{\sqrt{27}}{27} = \pm \frac{\sqrt{3}}{9}
\]
Since \( x \) is positive and real, only \( \frac{\sqrt{3}}{9} \) is the answer.
Choice D

27.) Using the formula for velocity:
Trent’s velocity = \( \frac{x}{30} \)
Lois’s velocity = \( \frac{x}{20} \)
Their combined velocity = \[
\frac{x}{30} + \frac{x}{20} = 1 \\
x = 12
\]
Choice B

28.) Distributing:
\[ z^3 + z = 3 + z^3 \]
\[ z = 3 \]
Choice E

29.) Sum of Roots = \(-\frac{b}{a}\)

\[ 2\sqrt{2} \]

Choice D

30.) Finding a LCD:

\[ 4x^2 - x - 2 = 0 \]

\[ x = \frac{1 \pm \sqrt{33}}{8} \]

Choice D