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:

$$\frac{2x+390}{7} = 80$$

$$2x = 170$$

$$x = 85$$

Choice E

3.) Using the definition of the absolute value:

$$x^2 + x - 1 = 1 \qquad x^2 + x - 1 = -1$$

$$x^2 + x - 2 = 0 \qquad x^2 + x = 0$$

$$x = -2 \text{ or } 1 \qquad x = -1 \text{ or } 0$$

Sum of solutions: -2+1+-1+0=-2

Choice A

4.) Squaring both sides of the equation:

$$\left(\sqrt{10+3\sqrt{x}}\right)^2 = \left(\sqrt{x}\right)^2$$

$$\left(3\sqrt{x}\right)^2 = \left(x-10\right)^2$$

$$x^2 - 29x + 100 = 0$$

$$x = 4 \text{ or } 25$$

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:

$$3x - |2x+1| = 4$$

$$|2x+1| = 3x - 4$$

$$2x + 1 = 3x - 4 \qquad \cancel{2x+1 = -3x+4}$$

$$x = 5 \qquad \cancel{x = 3/5}$$

extraneous

$$\cancel{3x - |2x+1| = -4}$$

$$\cancel{|2x+1| = 3x+4}$$

$$\cancel{2x+1 = 3x+4} \qquad 2x+1 = -3x-4$$

$$\cancel{x = -3} \qquad x = -1$$

extraneous

Choice C

7.) Using the discriminant:

$$25 - 4*3*-8$$

$$25 + 96$$

$$121$$

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:

$$0 < 3x + 2 < 8$$

$$-2 < 3x < 6$$

$$-2/3 < x < 2$$

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:

$$bx + ax = abc$$

$$x\left(a+b\right) = abc$$

$$x = \frac{abc}{\left(a+b\right)}$$

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:

$2(y-4)(y+6)+3(y+3)(y+6)=5(y+3)(y-4)$

$2y^2+4y-48+3y^2+27y+54=5y^2-5y-60$

$36y=-66$

$y=-11/6$

Choice A

17.) Let $y=(3x+4)$

$y^2-6y+9=0$

$y=3$

$3x+4=3$

$x=-1/3$

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.

$121-4\bullet 1\bullet p>0, -4p>-121, p<\frac{121}{4}$. 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:

$x+y=18$

$y=2/3\, x$

$5/3\, x=18$

$x=10.8$

$y=7.2$

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. $rs=\frac{c}{a}=\frac{1}{3}$ and $r^2+s^2=\frac{b^2-2ac}{a^2}=\frac{49-2\bullet 3\bullet 1}{9}=\frac{43}{9}$. The product of $\frac{1}{3}$ and $\frac{43}{9}$ is $\frac{43}{27.}$

Choice D

25.) Using properties of logarithms:

$8=2x+1$

$x=7/2$

Choice E

26.) Let $y=x^{2/3}$

$3y^2+5y-2=0$

$y=-2$ or $1/3$

$x=\pm 2i\sqrt{2}$ or $\frac{\pm\sqrt{27}}{27}=\pm\frac{\sqrt{3}}{9}$

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 = $-\dfrac{b}{a}$

$2\sqrt{2}$

Choice D

30.) Finding a LCD:

$4x^2 - x - 2 = 0$

$x = \dfrac{1 \pm \sqrt{33}}{8}$

Choice D