Q1(1):

$\sqrt{27} - \sqrt{2}(\sqrt{6} + \sqrt{2}) + \frac{6}{\sqrt{3}}$

$= 3\sqrt{3} - 2\sqrt{3} - 2 + 2\sqrt{3}$

$= \boxed{3\sqrt{3} - 2}$

Q1(2):

$$|x - \frac{3}{2}| < \frac{7}{2}$$
$$-\frac{7}{2} < x - \frac{3}{2} < \frac{7}{2}$$
$$\boxed{-2} < x < \boxed{5}$$

Q1(3):

$x^2 - 2ax + a^2 - b^2 = (x-a)^2 - b^2 = \boxed{(x-a+b)(x-a-b)}$

Q1(4):

Comparing the power of 42 of $\sqrt[3]{3}$, $\sqrt[4]{9}$ and $\sqrt[7]{27}$, i.e. $3^{14}, 3^{21}$ and 3^{18}, we have 3^{21} is the largest. Therefore, $\boxed{\sqrt[4]{9}}$ is the largest.

Moreover, as $\log_3 5 < \log_3 25 < \log_3 27$, we have $\boxed{3\log_9 5}$ is the smallest.

Q1(5):

The sum of roots=$\alpha + \beta = -\frac{-3}{1} = \boxed{3}$.

The product of roots=$\alpha\beta = \frac{p}{1} = p$.

As $\alpha^2 + \beta^2 = (\alpha = \beta)^2 - 2\alpha\beta = 9 - 2p$, we have $p = \boxed{4}$.

Q1(6):

The number is equal to the number of permutations of the 6 numbers, i.e. $\frac{6!}{1!2!3!} = \boxed{60}$.

Q1(7):

Note that the common difference is 3.

As $28 = -5 + 3 \cdot 11$, the progression has 12 terms.

Therefore, the sum=$\frac{(-5+28)(12)}{2} = \boxed{138}$.

Q1(8):

$\vec{AB} =< 1, x-3, 3 >$ and $\vec{BC} =< y-2, 1-x, 3 >$.

When A, B, C are collinear, we have $\vec{AB} // \vec{BC}$, i.e. $\vec{AB} = k\vec{BC}$.

Therefore, $\frac{1}{y-2} = \frac{x-3}{1-x} = \frac{3}{3} = k$.

By solving, we have $x = \boxed{2}$ and $y = \boxed{3}$.

Q1(9):

(i): $f'(x) = \boxed{x^2 - 4x + 4}$.

(ii): We find the extremum point by setting $f'(x) = 0$, i.e. $x = 2$.

The table of signs is given:

x	$(-\infty, 2)$	$(2, +\infty)$
$f'(x)$	$+$	$+$

Therefore, $f(x)$ is increasing and there is only $\boxed{1}$ real root of it.

(iii): By the properties of odd function and even function, we have:

$\int_{-1}^{1} f(x)dx$

$= 2\int_0^1 (-2x^2 + 1)dx$

$= 2[-\frac{2}{3}x^3 + x]_0^1$

$= \boxed{\dfrac{2}{3}}$

Q2:

(1): By the cosine formula,

$$AC^2 = AB^2 + BC^2 - 2(AB)(BC)\cos\angle ABC$$

$$AC = \sqrt{8^2 + 10^2 - 2(8)(10)(\frac{4}{5})} = \boxed{6}$$

(2): $\sin\angle ABC = \sqrt{1 - \cos^2\angle ABC} = \sqrt{1 - (\frac{4}{5})^2} = \boxed{\dfrac{3}{5}}$.

(3): By the sine formula,

$$\frac{BC}{\sin\angle BAC} = \frac{AC}{\sin\angle ABC}$$

$$\sin\angle BAC = 1$$

$$\angle BAC = \boxed{90^\circ}$$

Alternative Recongnise the Pythagoras triple $(6, 8, 10)$, $\angle ABC$ is a right-angle triangle with $\angle BAC = \boxed{90^\circ}$.

(4): As $\angle BAC = 90^\circ$, BC is the diameter of the circumcircle.

Thereofore, the radius$=\frac{BC}{2} = \boxed{5}$.

Alternative By the sine formula, $2R = \frac{AC}{\sin\angle ABC} = 10$, $R = \boxed{5}$.

(5): Note that M is the circumcenter.

$\vec{AB}\cdot\vec{AM}$

$= AB \cdot AM \cos\angle BAM$

$= \frac{AB^2+AM^2-BM^2}{2}$

$= \frac{64+25-25}{2}$

$= \boxed{32}$

(6): $\vec{MA}\cdot\vec{MB}$

$= MA \cdot MB \cos\angle AMB$

$= \frac{MA^2+MB^2-AB^2}{2}$

$= \frac{25+25-64}{2}$

$= \boxed{-7}$

Q3:

(1): As the axis of symmetry is $x = 2$, the equation of the parabola is $y = k(x-2)^2 + c$.

Substitue the coordinates of A and C into it respectively, we have:

$$k + c = 0,\ \ 4k + c = 3$$

By solving, we have $k = 1$ and $c = -1$.

Therefore, the equation is $y = (x-2)^2 - 1 = \boxed{1}x^2 + \boxed{-4}x + \boxed{3}$.

(2): By the two points form of straight line, l is $y = \frac{3-0}{4-1}(x-1)$, i.e. $y = \boxed{x-1}$.

(3): The slope of m is -1.

By the point-slope form of straight line, the equation of m is $y = -(x-3)$, i.e. $y = \boxed{-x+3}$.

(4): The intersection point between m and l is (2,1).

Therefore, the area$=\frac{1}{2}(\sqrt{(2-1)^2+(1-0)^2})(\sqrt{(2-3)^2+(1-0)^2}) = \boxed{1}$.