1. Note that $9^{3-x} = 9^{2(4-2x)}$. Therefore $3 - x = 2(4 - 2x)$, i.e. $3 - x = 8 - 4x$, i.e. $3x = 5$ or $x = \frac{5}{3}$, hence (A).

2. If $p = q(r - 1/s)$, then $p/q = r - 1/s$, i.e. $1/s = r - p/q$, or
   
   $s = \frac{1}{r - \frac{p}{q}} = \frac{q}{qr - p}$,

   hence (B).

3. Note that $(f(2), f(-2)) = (0, 4)$ and that $(f(4), f(-4)) = (0, 8)$. Therefore the coordinates of the mid-point are $(0, 6)$, hence (B).

4. Let the number of questions be $x$. Therefore $9 + 0.3(x - 10) = 0.5x$, i.e. $9 - 3 = 0.2x$, i.e. $x = 6/0.2 = 30$, hence (E).
5. The square marked * must be filled with $Q$, because there are already $R$ and $S$ on the same column and $P$ and $T$ on the same main diagonal.

\[
\begin{array}{cccc}
P & Q & R & S & T \\
\hline
 & & * & & \\
S & T & P & Q & R \\
Q & R & S & T & P \\
T & P & Q & R & S \\
R & S & T & P & Q \\
\end{array}
\]

Now the only square on the first column that can be filled with $Q$ is the shaded one.

**Note:** The solution is unique and is a Latin Square.

6. Since $a^2 = a + 2$, $a^3 = a(a + 2) = a^2 + 2a = a + 2 + 2a = 3a + 2$, hence (C).

7. Let the number of sides be $n$. Then the angle subtended at the centre by a side equals $360^\circ/n$ so that $50/(360/n)$ is an integer, i.e. $50n/360 = 5n/36$ is an integer. The smallest such $n$ is 36, hence (E).

8. Let the probability of landing on a particular triangular face be $p$. Then the probability of landing on a particular square face is $2p$. Since probabilities of all mutually exclusive outcomes add to 1 we require

\[
6 \times 2p + 8 \times p = 1,
\]

i.e.

\[
p = \frac{1}{20}.
\]

Thus the probability of landing on a triangular face is $8 \times \frac{1}{20} = \frac{2}{5}$, hence (E).

9. The total average wear on the four tyres in 1 km is

\[
\frac{1}{4} \left( \frac{1}{40000} + \frac{1}{40000} + \frac{1}{60000} + \frac{1}{60000} \right) = \frac{1}{48000}
\]

of their capacity. Thus, presuming use of the tyres on each wheel is optimised, the maximum distance which the car can travel is 48 000 km, hence (C).
10. The number of paths to each node shown on the diagram (drawn schematically) are found by successive addition. It is then easily seen that the number of paths to point $R$ is 18. Hence by symmetry (there are 3 ways of approaching $Q$), the total number is $3 \times 18 = 54$, hence (D).