Q1(1):

$2a^2b^3 \times (-3ab^2)^2 \div (-6a^3b^5)$

$= \frac{18a^4b^7}{-6a^3b^5}$

$= \boxed{-3ab^2}$

Q1(2):

$$|x-1| < 3$$

$$-3 < x-1 < 3$$

$$\boxed{-2} < x < \boxed{4}$$

Q1(3):

$x + \frac{1}{x} = \frac{x^2+1}{x} = \frac{3x}{x} = \boxed{3}$.

$x^2 + \frac{1}{x^2} = (x+\frac{1}{x})^2 - 2 = 3^2 - 2 = \boxed{7}$.

Q1(4):

i): All the three cards are odd. The probability=$\frac{C_3^5}{C_3^{10}} = \frac{10}{120} = \frac{1}{\boxed{12}}$.

ii): There are two cases:

-All the three cards are even. The probability=$\frac{1}{12}$.

-One card is even while the other two are odd.

The probability=$\frac{C_1^5 \cdot C_2^5}{C_3^{10}} = \frac{50}{120} = \frac{5}{12}$.

Given the above, the total probability=$\frac{1}{12} + \frac{5}{12} = \frac{1}{\boxed{2}}$.

Q1(5):

As the three vectors form a triangle, we have $\vec{AB} + \vec{BC} + \vec{CA} = \vec{0}$, i.e. $< x+2, y-3, z+5 > = < 0,0,0 >$.

By solving, we have $x = \boxed{-2}$, $y = \boxed{3}$ and $z = \boxed{-5}$.

$\vec{AB} \cdot \vec{AC} = < -2,2,1 > \cdot < -3,5,5 > = 6 + 10 + 5 = \boxed{21}$.

Q1(6):

$y = \log_2(8x-16) = \log_2(8(x-2)) = \log_2 8 + \log_2(x-2) = 3 + \log_2(x-2)$.

Therefore, the graph shifts by $\boxed{2}$ on the x-axis and $\boxed{3}$ on the y-axis to the graph of $y = \log_2 x$.

Q1(7):

Let d be the common different, as $2 + 3d = -7$, we have $d = -3$.

Therefore, the arithmetic progression is $2, \boxed{-1}, \boxed{-4}, -7$.

Let r be the common ratio, as $-6r^2 = -54$, we have $r = \pm 3$.

Therefore, the arithmetic progression is $\boxed{\pm 2}, -6, \boxed{\pm 18}, -54$.

Q1(8):

Note that $\frac{1}{k(k+1)} = \frac{1}{k} - \frac{1}{k+1}$.

Therefore, $\sum\limits_{k=1}^{n} \frac{1}{k(k+1)} = 1 - \frac{1}{n+1}$ by the telescoping property.

Then,

$$1 - \frac{1}{n+1} = \frac{6}{7}$$

$$n + 1 = 7$$

$$n = \boxed{6}$$

Q1(9):

$f'(x) = (x-5)+(x+3)$ by the product rule. Therefore, $f'(-1) = -6+2 = \boxed{-4}$.

Q2:

(1): By completing the square, we have $y = (x + \frac{1}{2})^2 - \frac{9}{2}$.

Therefore, the vertex is $(\frac{\boxed{-1}}{2}, \frac{\boxed{-9}}{2})$.

When a and b have common points, then the equation $x^2 + x - 2 = 3x + a$ has solution, i.e.

$$\Delta = 4 - 4(-2 - a) \geq 0$$

$$a \geq \boxed{-3}$$

(2): If $a=0$, then by solving $x^2+x-2=3x+1$, i.e. $x^2-2x-3=0$, we have

$x=\boxed{-1}, \boxed{3}$.

Therefore, the area$=\int_{-1}^{3}((3x+1)-(x^2+x-2))dx$

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

$=-9+9+9-\frac{1}{3}-1+3$

$=\frac{\boxed{32}}{3}$.

When r reaches its upper boundary, it is tangent to $y=3x+1$.

By that time, the equation $x^2+(3x+1)^2=r^2$ has only one solution., i.e.

$$\Delta = 36-4(10)(1-r^2)=0$$

$$r^2=\frac{1}{10}$$

$$r=\frac{\boxed{\sqrt{10}}}{10}$$

Q3:

(1): $\frac{1}{3}-(\frac{1}{5}-\frac{7}{2})=\frac{1}{3}+\frac{33}{10}=\frac{109}{30}\approx 3.6\approx\boxed{4}$.

(2): $(\sqrt{5}-\sqrt{2})^2=7-2\sqrt{10}$. As $3\sqrt{9}<\sqrt{10}<\sqrt{10.5625}=3.25$, we have $0.5<7-2\sqrt{10}<1$. Therefore, the closest integer is $\boxed{1}$.

(3): $\sin 30^\circ+\cos 45^\circ+\tan 60^\circ=\frac{1}{2}+\frac{\sqrt{2}}{2}+\sqrt{3}\approx 0.5+0.7+1.7=2.9\approx\boxed{3}$.

(4): $\sum_{i=1}^{5}(\frac{2}{3})^i = \frac{(\frac{2}{3})^6 - \frac{2}{3}}{\frac{2}{3}-1} = 2 - \frac{2^6}{3^5} \approx \boxed{2}$.

(5): $\int_0^2 (x^2 + 3x - 1)dx$

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

$= \frac{8}{3} + 6 - 2$

$= \frac{20}{3}$

$\approx \boxed{7}$