7. [15 points] In the table below, there is at least one function that could be exponential and one that could be linear.

q	1	4	5
$A(q)$	17	$\frac{11}{3}$	5
$B(q)$	$\frac{8}{3}$	9	$\frac{27}{2}$
$C(q)$	125	25	1
$D(q)$	$\frac{3}{2}$	2	$\frac{13}{6}$

a. [3 points]
Which of the above functions could be linear? Circle your answer(s). You do not have to show your work for this part.

$A(q)$ $\quad$ $B(q)$ $\quad$ $C(q)$ $\quad$ $\boxed{D(q)}$

b. [3 points]
Which of the above functions could be exponential? Circle your answer(s). You do not have to show your work for this part.

$A(q)$ $\quad$ $\boxed{B(q)}$ $\quad$ $C(q)$ $\quad$ $D(q)$

c. [4 points]
Find a possible formula for one of the functions above that you found could be linear. Show your work, and circle your answer.

Solution: The slope of $D(q)$ is $\frac{1}{6}$, so $D(q) = \frac{q}{6} + c$. Using the point $(4, 2)$, we see that $c = \frac{4}{3}$, so

$$D(q) = \frac{q}{6} + \frac{4}{3}$$

d. [5 points]
Find a possible formula for one of the functions above that you found could be exponential. Show your work, and circle your answer.

Solution: Using the last two columns of the table, we get that the growth factor for $B(q)$ is given by

$$\frac{27}{2} \cdot \frac{1}{9} = \frac{3}{2}$$

so that $B(q) = a(\frac{3}{2})^q$. Using the point $(1, \frac{8}{3})$, we get that

$$\frac{8}{3} = a(\frac{3}{2})$$

so that $a = \frac{16}{9}$, hence

$$B(q) = \frac{16}{9}(\frac{3}{2})^q$$

