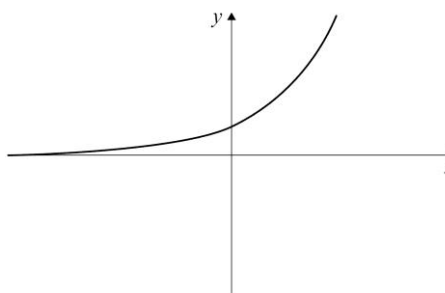
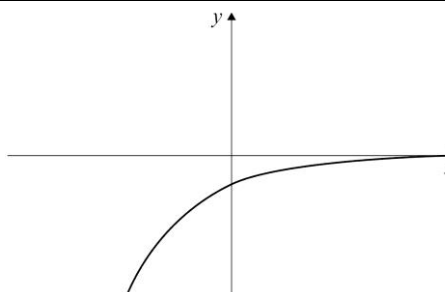


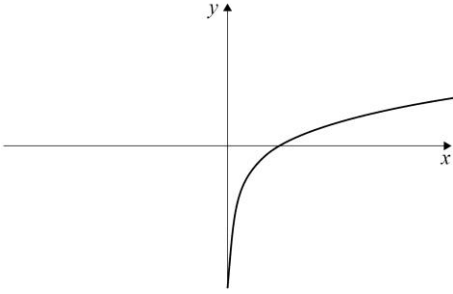
AS and A-level MATHS

Ex ponentials 1

Mark Sch eme

Specification content coverage: F1, F2, F3, F4

Question	Solutions	Mark
1 (a)	 <p>selected</p>	1
1 (b)	 <p>(0, -1) stated as y-intercept</p>	1 1
2	<p>$\log x^3$ or $\log y^{0.5}$ or $\log z^2$</p> <p>two logs combined correctly</p> $\log \frac{x^3 y^{0.5}}{z^2}$	1 1 1
3	<p>$\ln e^x = x$ or $2\ln e^{-x} = -2x$ or $0.5\ln e^{2x} = x$</p> <p>$4x$</p>	1 1

4	 <p>$(1/a, 0)$ stated as x-intercept</p>	1 1
5	$\log \frac{a^2}{bc^{\frac{1}{3}}}$ $2\log a$ or $\log b$ or $1/3\log c$ $2\log a - \log b - 1/3\log c$	1 1 1
6	2 expressed as $\log_b b^2$ $3\log_b 3$ expressed as $\log_b 27$ $\log_b \frac{5}{9b^2}$	1 1 1
7	$\log_{10} 1000 + \log_{10} x^{-0.5}$ $\log_{10} 10^3 - 0.5\log_{10} x$ -272	1 1 1
8	gradient of tangent at $x = 3$ is ke^{3k} Rearranged equation of line is $y = -4e^{-bx} + 13e^{-b}$ $ke^{3k} = -4e^{-b}$ $k = -4, b = 12$	1 1 1 1
9	$\ln x = \ln\left(\frac{x+6}{x+2}\right)$ combine logs $x = \frac{x+6}{x+2}$ eliminate logs $x^2 + 2x = x + 6$ $x^2 + x - 6 = 0$ $x = 2$ only ($x = -3$ disregarded)	1 1 1 1 1
10	gradient of the tangent at $x = 0$ is 3 gradient of the normal at $x = 0$ is $-\frac{1}{3}$ equation of the normal is $(y - 1) = -\frac{x}{3}$ $\left(-\frac{18}{13}, \frac{19}{13}\right)$	1 1 1 1