A1.5.1:

(a) $y = a^x$

(b) $\mathbb{R}$

(c) $(0, \infty)$

(d)

A1.5.2:

(a) e is the unique constant such that the tangent to the graph of e^x at $x = 0$ has a slope of 1

(b) 2.718

(c) $f(x) = e^x$

A1.5.3: Skip

A1.5.4: Skip

A1.5.5: Skip

A1.5.6: Skip

A1.5.7: Skip

A1.5.8: Skip

A1.5.9: Skip

A1.5.10: Skip

A1.5.11: Skip

A1.5.12: Skip

A1.5.13:

(a) $y = e^x - 2$

(b) $y = e^{(x-2)}$

(c) $y = e^{-x}$

(d) $y = -e^x$

(e) $y = -e^{-x}$

A1.5.14:

(a) $y = -e^{-(x+4)-4}$

(b) $y = -e^x + 4$

A1.5.15:

(a) $\mathbb{R}$

(b) $\mathbb{R} - \{0\}$

A1.5.16:

(a) $\mathbb{R}$

(b) $(-\infty, 0]$

A1.5.17: $f(x) = 3 \cdot 2^x$

A1.5.18: $f(x) + 2 \cdot (1/3)^x$

A1.5.19:

$$\begin{aligned}\frac{f(x+h) - f(x)}{h} &= \frac{5^{x+h} - 5^x}{h} \\ &= \frac{5^x \cdot 5^h - 5^x}{h} \\ &= \frac{5^x(5^h - 1)}{h} \\ &= 5^x \left(\frac{5^h - 1}{h}\right)\end{aligned}$$

A1.5.20: The latter.

$$(2^{n-1} + 2^{n-2} + \cdots + 1) = 2^n - 1$$

And $2^{30} - 1 > 1000000000$

A1.5.21: $2^{24} \gg 24^2$

A1.5.22: Skip

A1.5.23: Skip

A1.5.24: Skip

A1.5.25:

(a) $100 \cdot 2^{15} = 3276800$

(b) $100 \cdot 2^t$

(c) $100 \cdot 2^{20}$

A1.5.26:

(a) $2 \cdot (1/2)^{60/15} = 0.125$

(b) $2 \cdot (1/2)^{t/15}$

(b) $2 \cdot (1/2)^{96/15}$

A1.5.27: Skip

A1.5.28: Skip