

p.251 #2 a) $f(x) = -3(4^{x+1})$ Text says 4^x or $(\frac{1}{2})^x$ b) $g(x) = 2(\frac{1}{2})^{2x} + 3$

The base function is $y = 4^x$.

- horiz. translation left 1 unit,
vert. exp. factor of 3, refl. over
x-axis.

Base function $y = \frac{1}{2}^x$

Horiz. comp. factor $\frac{1}{2}$, vert.
exp factor 2 and transl. up 3 units.

c) $h(x) = 7(0.5^{x-4}) - 1$

Base function: $y = (\frac{1}{2})^x$

Transl. 4 units right, vert. exp.
factor of 7 and transl. 1 unit down

* d) $K(x) = 5^{3x-6}$ Factor 3 out
 $= 5^{3(x-2)}$

Base function: $y = 5^x$

Horiz. comp. factor $\frac{1}{3}$
and translation 2 units right.

p.268

11.a) $y = (\frac{1}{2})^{\frac{x}{2}} - 3$

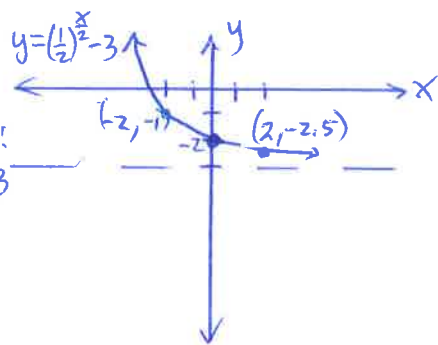
Base function: $y = (\frac{1}{2})^x$

$(x,y) \rightarrow (2x, y-3)$

$(-1, 2) \rightarrow (-2, -1)$

$(0, 1) \rightarrow (0, -2)$

$(1, \frac{1}{2}) \rightarrow (2, -2.5)$



d) $y = -\frac{1}{10} 5^{3x-9} + 10$

$y = -\frac{1}{10} 5^{3(x-3)} + 10$

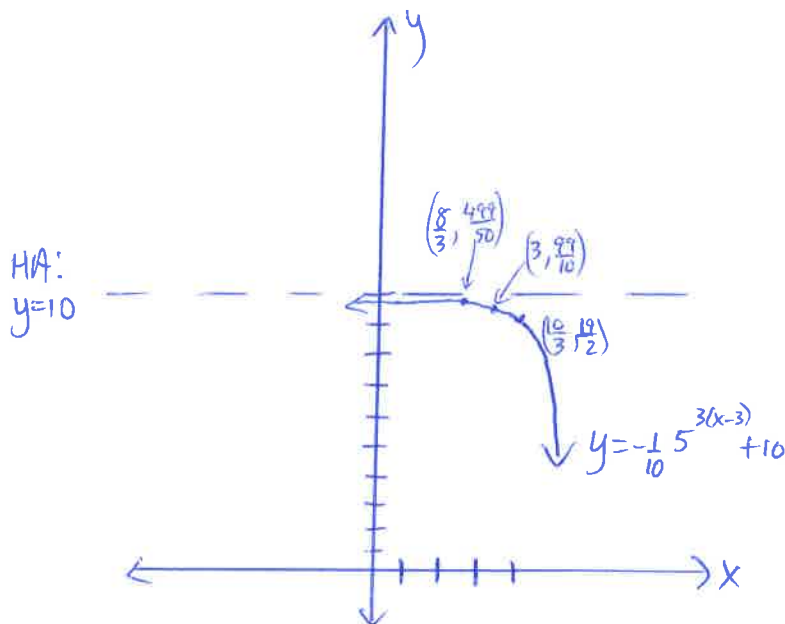
Base function $y = 5^x$

$(x,y) \rightarrow (\frac{1}{3}x+3, -\frac{1}{10}y+10)$

$(-1, \frac{1}{5}) \rightarrow (\frac{8}{3}, \frac{499}{50})$

$(0, 1) \rightarrow (3, \frac{99}{10})$

$(1, 5) \rightarrow (\frac{10}{3}, \frac{19}{2})$



p. 268

11. b) $y = \frac{1}{4}(2)^{-x} + 1$

HA: $y = 1$

x-int, $y = 0$
 $-1 = \frac{1}{4}(2)^{-x}$

$-4 = 2^{-x}$

no x-int (all above $y = 1$)

y-int, $x = 0$

$y = \frac{1}{4}(2)^0 + 1$
 $= \frac{1}{4} + 1$
 $= \frac{5}{4}$

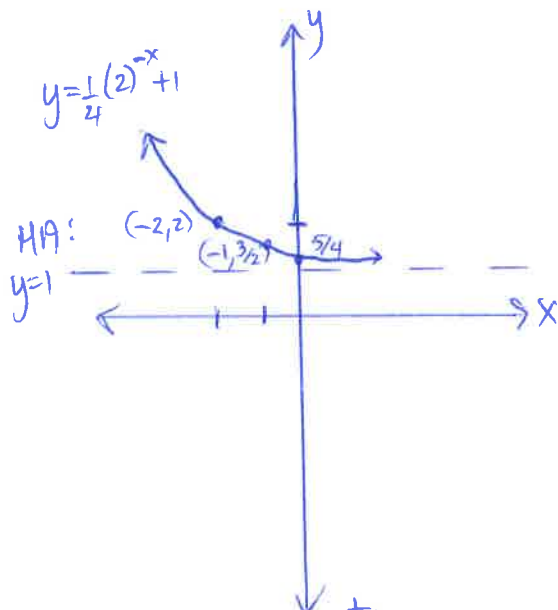
Extra Points

when $x = -1$

$y = \frac{1}{4}(2)^{-(-1)} + 1$
 $= \frac{1}{4}(2)^1 + 1$
 $= \frac{3}{2}$

when $x = -2$

$y = \frac{1}{4}(2)^{-(-2)} + 1$
 $= 1 + 1$
 $= 2$



11. $T(t) = 69\left(\frac{1}{2}\right)^{t/30} + 21$

a) The base of $\frac{1}{2}$ indicates this is an example of exponential decay, i.e. < 1

b) The initial temp. is 90° (i.e. $69 + 21$)

d) $t = 48 \text{ min}$
 $T(48) = 69(0.5)^{48/30} + 21$
 $= 44^\circ$

11. c) $y = -2(3)^{2x+4}$

HA: $y = 0$

$\therefore$ reflected over x-axis and

HA is $y = 0$

$\therefore$ no x-int.

y-int, $x = 0$

$y = -2(3)^4$
 $= -162$

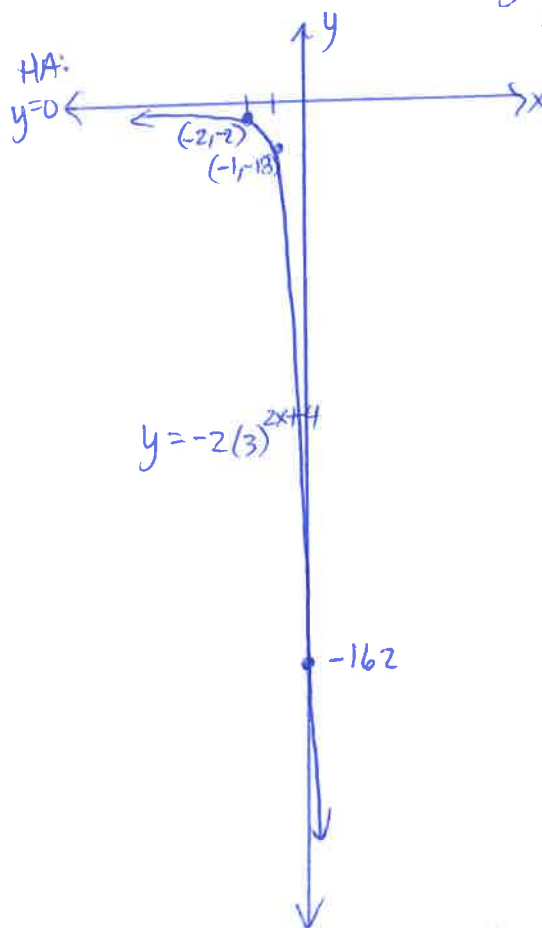
Extra points

when $x = -1$

$y = -2(3)^2$
 $= -18$

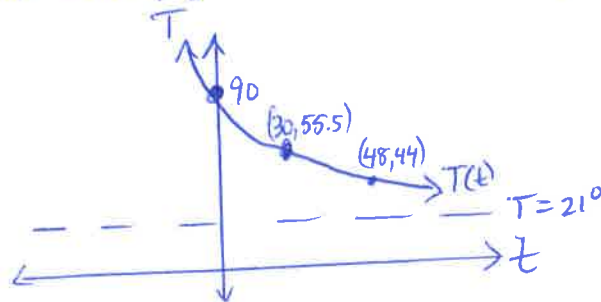
when $x = -2$

$y = -2(3)^0$
 $= -2$



e) If the coffee cooled faster, the denom of the exponent would be smaller, and f) this means the original graph would be horiz. compr.

c) HA: $T = 21^\circ$, y-int is $(0, 90^\circ)$ and $(30, 55.5^\circ)$ is apt



9. a and b match decay graphs since $b < 0$, but a is also reflected over both axes with an H.A. of $y = 3$

a) $f(x) = -\frac{1}{4}^{-x} + 3$ matches (iii)

and d) $h(x) = 2\left(\frac{5}{4}\right)^x + 3$ matches (i)

b) $y = \left(\frac{1}{4}\right)^x + 3$ matches (ii)

c) $g(x) = -\left(\frac{5}{4}\right)^{-x} + 3$ matches (iv)

~~graph~~ → ~~graph~~ → ~~graph~~

$$12. f(x) = \frac{-3}{2^{x+2}} - 1$$

$$= -3(2)^{-(x+2)} - 1$$

Base Function $y = 2^x$
 $(x, y) \rightarrow (-x-2, -3y-1)$

$(-1, \frac{1}{2}) \rightarrow (-1, -\frac{5}{2})$

$(0, 1) \rightarrow (-2, -4)$

$(1, 2) \rightarrow (-3, -7)$

and $f(0) = -3(2)^{-2} - 1$

$$= -\frac{3}{4} - \frac{4}{4}$$

$$= -\frac{7}{4}$$

