Revision Exercise (Conversion to Linear Form)

1. (i)

(a) $\frac{y}{x}$ vs x^2
(b) $\frac{1}{y}$ vs $\frac{1}{x}$
(c) xy vs x
(d) y^2 vs x^2
(e) y vs x^3
(f) $\frac{y}{x}$ vs x^2
(g) $\frac{1}{y}$ vs x
(h) $\frac{1}{y}$ vs x
(i) $\lg y$ vs x
(j) $\lg y$ vs x

1. (ii) $m \Rightarrow$ gradient; $c \Rightarrow$ y-intercept

(a) $m = p$; $c = q$
(b) $m = \frac{p}{q}$; $c = \frac{p}{q}$
(c) $m = p$; $c = q$
(d) $m = p$; $c = q$
(e) $m = p$; $c = q$
(f) $m = \frac{q}{p}$; $c = \frac{1}{p}$
(g) $m = \frac{1}{p}$; $c = \frac{q}{p}$
(h) $m = \frac{1}{p}$; $c = \frac{q}{p}$
(i) $m = \lg q^2$; $c = \lg p$
(j) $m = \lg q$; $c = \lg p^2$

2. (i)

(a) $y = \frac{a}{x} + b$
(b) $y = ax^4 + \frac{a}{b}$
(c) $\lg y = a \lg x + \frac{b}{a}$
(d) $\lg y = -a \lg x + b$
(e) $y^2 = ax^2 + b$
(f) $y = ax^{\frac{3}{2}} + b$
(g) $\frac{y}{\sqrt{x}} = a\sqrt{x} + b$
(h) $\frac{y}{\sqrt{x}} = a\sqrt{x} - b$
(i) $\lg y = x(-\lg b) + \lg a$
(j) $\lg y = -b \lg x + \lg a$
(k) $\lg y = -b \lg x + \lg(\frac{1}{a})$
(l) $\lg y = b \lg x + \lg(\frac{1}{a})$

2. (ii)

(a) y vs $\frac{1}{x}$
(b) y vs x^4
(c) $\lg y$ vs $\lg x$
(d) $\lg y$ vs $\lg x$
(e) y^2 vs x^2
(f) y vs $x^{\frac{3}{2}}$
(g) $\frac{y}{\sqrt{x}}$ vs $\sqrt{x}$
(h) $\frac{y}{\sqrt{x}}$ vs $\sqrt{x}$
(i) $\lg y$ vs x
(j) $\lg y$ vs $\lg x$
(k) $\lg y$ vs $\lg x$
(l) $\lg y$ vs $\lg x$

2. (iii) $m \Rightarrow$ gradient; $c \Rightarrow$ y-intercept

(a) $a = m$; $b = c$
(b) $a = m$; $b = \frac{a}{c}$
(c) $a = m$; $b = ac$
(d) $a = -m$; $b = c$
(e) $a = m$; $b = c$
(f) $a = m$; $b = c$
(g) $a = m$; $b = c$
(h) $a = m$; $b = -c$
(i) $a = 10^c$; $b = 10^{-m}$
(j) $a = 10^c$; $b = -m$
(k) $a = 10^{-c}$; $b = -m$
(l) $a = 10^{-c}$; $b = m$

3. $a = 10^{0.2}$; $b = 3$

4.

(a) Using Line of Best Fit on Microsoft Excel: $y = 1.95x + 3.15$

(b) Gradient represents A and y-intercept represents B

(c) $A = 1.95$; $B = 3.15$

(d) (i) $y = 16.8$

(d) (ii) $x = 6.077$

5.

(a) Using Line of Best Fit on Microsoft Excel: $y = 3.0722t^2 + 4.0059$

(b) $A = 3.0722$; $B = 4.0059$

(c) (i) $y = 176.817$

(c) (ii) $t = 5.5898$

6.

(a) Using Line of Best Fit on Microsoft Excel: $T = 3.3714(\frac{1}{t}) + 17.404$

(b) $k = 3.3714$; $c = 17.404$

(c) $T = 22.461\ ^\circ F$

(d) As $t \to \infty$, $T \to 17.404\ ^\circ F$

7.

(a) Plot $\lg y$ vs x. y-intercept $= \lg a$; Gradient $= \lg b$

(b) Using Line of Best Fit on Microsoft Excel: $\lg y = 0.1754x + 0.4903$. $a = 3.092$; $b = 1.498$

(c) (i) $y = 1833.69$

(c) (ii) $x = 27.962$

8.

(a) y-intercept $= \lg a$; Gradient $= b$

Using Line of Best Fit on Microsoft Excel: $\lg y = 1.7812 \lg x + 0.6519$. $a = 4.4864$; $b = 1.7812$

(b) (i) $y = 16379.4$

(c) (ii) $x = 145.643$

9.

(a) y-intercept $= \lg A$; Gradient $= \lg B$

Using Line of Best Fit on Microsoft Excel: $\lg P = 0.309t + 0.8761$. $A = 7.518$; $B = 2.037$

$P = 7.518 \times 2.037^t$

(b) When $t = 0$, $P = 7.518$. $\therefore P \simeq 7$ bacteria

(c) When $t = 12$ hours, $P = 7.518 \times 2.037^{720}$

(d) $t = 10.68$ minutes

10.

(a) $\frac{1}{y} = a(\frac{1}{x}) + b$

Plotting $\frac{1}{y}$ vs $\frac{1}{x}$ yields a straight-line graph where y-intercept $= b$ and Gradient $= a$

Using Line of Best Fit on Microsoft Excel: $\frac{1}{y} = 1.9387(\frac{1}{x}) + 3.6898$

(b) $a = 1.9387$; $b = 3.6898$

$\frac{x}{y} = 1.9387 + 3.6898x$

(c) (i) $y = 0.2521$

(c) (ii) $x = -3.433$