3.6 Worksheet

① ~~$y = a$~~ $A = a_0(b)^x$

Given

$x = 3$

$b = 0.40$

$a_0 = 8$

$= 8(0.4)^3$

$= 0.512$ m

$= 51.2$ cm

② $A = a_0(b)^x$

Given

$a_0 = 200$

$x = \frac{t}{15}$ min

$b = 2$

$t = 1.5$ hrs $= 90$ min

$= 200(2)^{\frac{90}{15}}$

$= 200(2)^6$

$= 12800$

③ Given

$b = 2$

$x = \frac{t}{15}$ mins

$a_0 = 20$

$A = 163840$

$A = a_0(b)^x$

$163840 = 20(2)^{\frac{t}{15}}$

$8192 = 2^{\frac{t}{15}}$

$2^{13} = 2^{\frac{t}{15}}$

$13 = \frac{t}{15}$

$195 = t$

$t = 195$ mins

④ Given

$a_0 = 1{,}280{,}000$

$A = 745{,}000$

$x = 12$

$A = a_0(b)^x$

$745{,}000 = 1{,}280{,}000(b)^{12}$

$0.58 = b^{12}$

$\sqrt[12]{0.58} = b$

$b = 0.956$

$\therefore$ 95.6% of the amt.

$\therefore$ 4.4% depreciation rate

(5)

Given

$a_0 = 40{,}000{,}000$

$x = 17$

$A = 1$

$A = a_0(b)^x$

$1 = 40{,}000{,}000\,(b)^{17}$

$\frac{1}{40{,}000{,}000} = b^{17}$

$\sqrt[17]{\frac{1}{40{,}000{,}000}} = b$

$b = 0.357$ $\quad$ $100\% - 35.7\%$

$= 35.7\%$ $\quad$ $= 64.3\%$

∴ Spent 64.3% of earnings each year

(6)

Given

$y = 9\left(\frac{3}{2}\right)^x$

sub $y = 30.375$

$30.375 = 9\left(\frac{3}{2}\right)^x$

or $\frac{30.375}{9}$ $\frac{30375}{900}$ reduce $\frac{27}{8}$

$3.375 = \left(\frac{3}{2}\right)^{2x}$

$\left(\frac{3}{2}\right)^3 = \left(\frac{3}{2}\right)^x$ ∴ 1980 ~~35~~ ∴ 1983

$x = 3$

∴ In 1983 they produced 30.375 6 wh.

(7) Given

$A = 2954.90$

$a_0 = ?$

↑ 3.4% 0.034

$b = 1.034$

$x = 5$

$A = a_0(b)^x$

$2954 = a_0(1.034)^5$

$2499.24 = a^0$

∴ Initial investment $2499.24

(8) Given

$a_0 = 7000$

$A = 17500$

$x = 3$

$A = a_0(b)^x$

$17500 = 7000\,(b)^3$

$\frac{17500}{7000} = b^3$

$\sqrt[3]{\frac{17500}{7000}} = b$

$b = 1.357$

$= 0.357$

35.7%

∴ Annual Growth ~~0.3~~ 35.7%

(9) Given

$a_0 = 32,500$

15% $b = 0.85$

$x = 5$

$A = a_0(b)^x$

$= 32500(0.85)^5$

$\doteq 14,420.42$

∴ It should be sold for $14,420.42

(10) Given

$a_0 = 64$

$h = 4$

$A = 2$

$x = \frac{t}{4}$

$b = \frac{1}{2}$

$A = a_0(b)^x$

$2 = 64\left(\frac{1}{2}\right)^{\frac{t}{4}}$

$\frac{2}{64} = \left(\frac{1}{2}\right)^{\frac{t}{4}}$

$\frac{1}{32} = \left(\frac{1}{2}\right)^{\frac{t}{4}}$

$\left(\frac{1}{2}\right)^5 = \left(\frac{1}{2}\right)^{\frac{t}{4}}$

$5 = \frac{t}{4}$

$t = 20$

∴ takes 20 days.

(11) Given

100 − 6.5 = 93.5

$b = 0.935$

$a_0 = ?$

$A = 1400$

$x = 10$

$A = A_0(b)^x$

$1400 = A_0(0.935)^{10}$

$\frac{1400}{(0.935)^{10}} = A_0$

$A_0 = 2742$

∴ There would be 2742 wolves

(12) Given

$a_0 = 500$

100 + 10 = 110 $b = 1.10$

$A = 732.05$

$A = a_0(b)^x$

$732.05 = 500(1.10)^x$

$1.4641 = (1.10)^x$

$(1.10)^4 = (1.10)^x$

$x = 4$

∴ 4 years

(13) Given

↓ 1.25%

100 − 1.25 = 98.75

$b = 0.9875$

$x = 3$

$A_0 = 698$

$A = a_0(b)^x$

$= 698(0.9875)^3$

$\doteq 672.15$

∴ Price $672.15

Note: in 2 years but A_0 was last year so 3 years

(14) Given

$a_0 = 3,642,250$

$b = 1.026$

$A = ?$

$x = 2004 - 1998$

$= 6$

$A = a_0(b)^x$

$= 3642250(1.026)^6$

$= 4246679$

(15) Given

$a_0 = 35,000$

$A = 37,500$

$x = 10$

1995 ⇒ 2013?

$x = 18$

$A = A_0(b)^x$

$37,500 = 35,000(b)^{10}$

$\frac{1.07}{} = b^{10}$

$\sqrt[10]{1.07} = b$

$b = 1.0069$

0.0069

0.69% increase.

2013: $A = 35000(1.0069)^{18}$

$= 39628$

∴ Population 39628

(16) Given

$b = 2$

$x = \frac{t}{20 \text{ min}}$

$a_0 = 140$

$A = 35840$

$A = a_0(b)^{\frac{t}{20}}$

$35840 = 140(2)^{\frac{t}{20}}$

$256 = 2^{\frac{t}{20}}$

$2^8 = 2^{\frac{t}{20}}$

$8 = \frac{t}{20}$

$t = 160$

∴ $\frac{2 \text{ hrs}}{120}$ + 40 mins