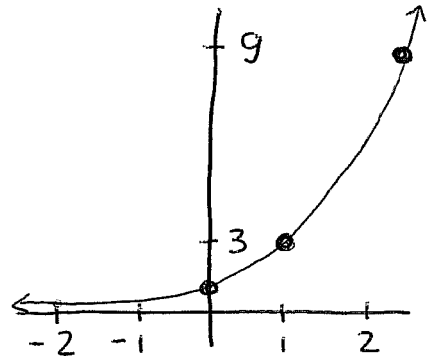


Assignment # 6 SOLUTIONS MATH MODELS

1

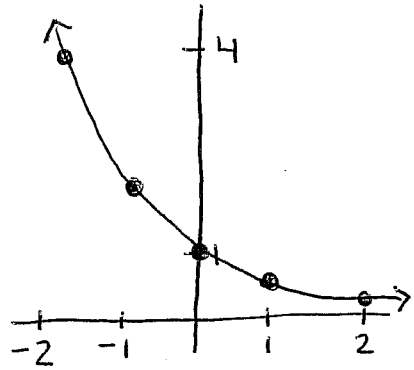
x	$y=3^x$
2	9
0	1
-2	$1/9$
1	3

(A)



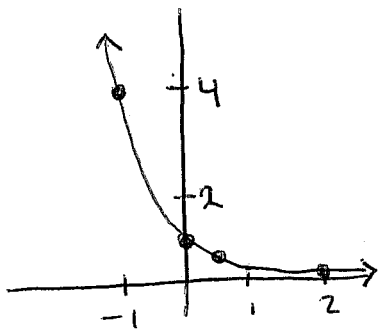
x	$y=(1/2)^x$
-1	2
2	$1/4$
1	$1/2$
0	1
-2	4

(B)



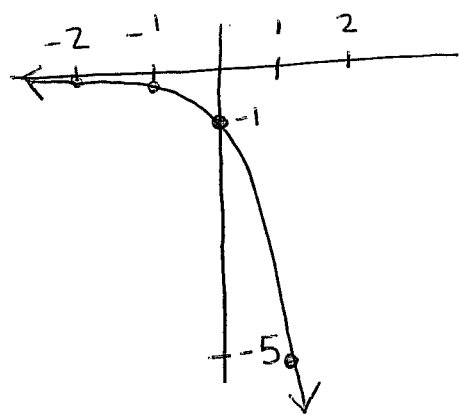
x	$y=4^{-x}$
2	$1/16$
$1/2$	$1/2$
$-1/2$	2
-1	4

(C)



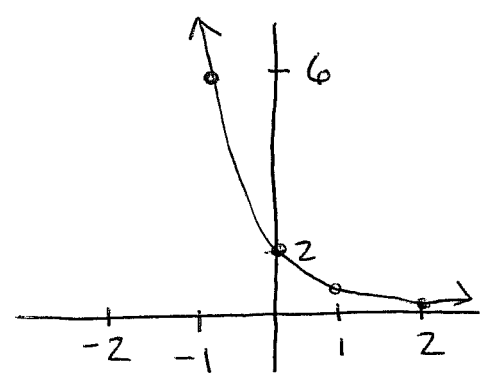
x	$y=-5^x$
0	-1
1	-5
-1	$-1/5$
-2	-0.04

(D)



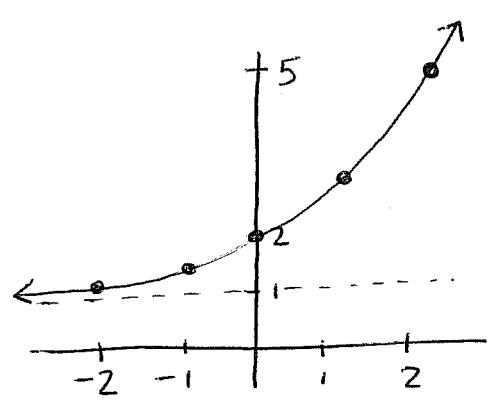
(E)

x	$y = 2(3^{-x})$
-1	6
0	2
2	2/9
-3	54



(F)

x	$y = 1 + 2^x$
-2	5/4
-1	3/2
0	2
2	5



2

(a) $T_y = 500(1.06)^t$

(b) $T_m = 500(1.002)^{12t}$

(compounded monthly where t is in years)

1 year

$T_y = 500(1.06)^1$
 $= 530 \$$

$T_m = 500(1.002)^{12 \cdot 1}$
 $= 512.13 \$$

10 years

$T_y = 500(1.06)^{10}$
 $= 895.42 \$$

$T_m = 500(1.002)^{12(10)}$
 $= 635.47 \$$

It is better to invest at 6% compounded annually in both cases.

③

$$M = P \left(\frac{1}{2}\right)^{t/h}$$

where

M is MASS After t days

P = 756 g

h = half life

③

$$M = 756 \left(\frac{1}{2}\right)^{t/471.7}$$

After 25 days

$$M = 756 \left(\frac{1}{2}\right)^{25/471.7} = 728.73 \text{ g remaining}$$

After 1 year = 365 days

$$M = 756 \left(\frac{1}{2}\right)^{365/471.7} = 442.17 \text{ g remaining}$$

④

$$\textcircled{a} \quad y = -2x^2 - 5x + 3$$

$$\text{vertex } x = \frac{-b}{2a} = \frac{-(-5)}{2(-2)} = \frac{5}{-4}$$

$$y = -2\left(\frac{5}{-4}\right)^2 - 5\left(\frac{5}{-4}\right) + 3 = 49/8$$

$$(x, y) = \left(-\frac{5}{4}, \frac{49}{8}\right) = (-1.25, 6.125)$$

intercepts

$$y = 3$$

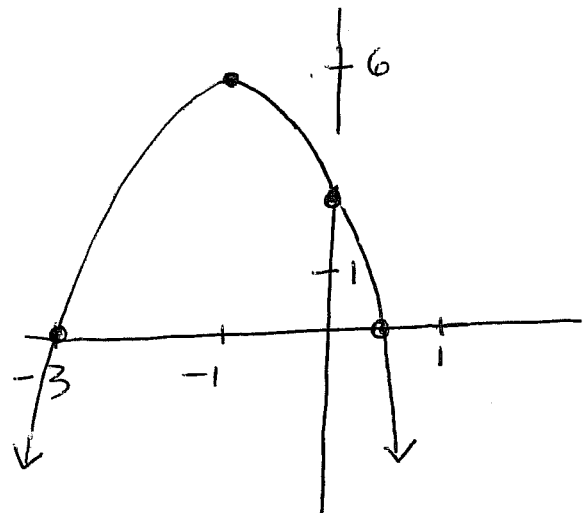
$$0 = -2x^2 - 5x + 3$$

$$0 = -2x^2 - 6x + x + 3$$

$$= -2x(x+3) + 1(x+3)$$

$$= (-2x+1)(x+3)$$

$$x = -3 \quad x = \frac{1}{2}$$



$$(b) \quad y = x^2 + x + 1$$

$$\text{vertex } x = -\frac{1}{2} \quad y = \left(-\frac{1}{2}\right)^2 + \left(-\frac{1}{2}\right) + 1$$

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

$$\left(-\frac{1}{2}, \frac{3}{4}\right)$$

$$y\text{-intercept } y = 1$$

$$x^2 + x + 1 = 0$$

$$x = \frac{-1 \pm \sqrt{1^2 - 4(1)}}{2} = \frac{-1 \pm \sqrt{-3}}{2} \quad \text{No solutions}$$

$$\text{NO } x\text{-intercepts}$$

