Cost Benefit Analysis & Calculation of Return on Investment(ROI)

Q1: The **Total Cost of Physical and Virtual** Layer Setup (H/w purchases) in **Majan IT Infra** is given below

No.	Description	Price($)
Computing Hardware		
1.	CPU	$1440.00
2.	Motherboard (C-422 chipset)	$350
3.	RAM	$1340
4.	Cooling	$150
5.	Power Supply	$140
6.	Hard Drive	$70
7.	Video Card	$600
	Sub Total	**$4090**
Storage Hardware		
1.	Disk Drives	$460 X 18 = $8280
2.	Enclosure	$2500
	Sub Total	**$10780**
Networking Hardware		
1.	Router	$285
2.	Switch	$3295
	Sub Total	$3580
	Total Cost	**$18450**

The Majan IT Infra company wants to merge their available H/w and other infrastructure with a Cloud provider
The **Total Cost of Using Cloud Services** for the above configuration is given below→

Type	Standard **Deploy in cloud provider accounts owned by Red Hat**	Bring your own cloud **Leverage your existing cloud provider discounts and settings**
~~Single availability-zone cluster~~	~~Starts at $36,000/yr~~	~~Starts at $16,000/yr~~
Multiple availability-zone cluster	Starts at $81,000/yr	Starts at **$36,000/yr**

The service that is recommended is the multiple availability zone cluster which cost $36,000 per year. It provides a cluster administrator console which allow to view and control the cluster. It allows to track down the issues.

Total Cost of security solutions

Item/Function	Description	Cost
RSA Authentication Manager (Multifactor Authentication)	Authentication Manager Base Edition, 30 – 100 Users	$75.65 per month ($907 per year)
Encryption	The price of full disk encryption	$232 per user, per year
Backup	1000GB (1TB)	$350, per year
Total		**$1489**

Using the data given in the above tables, calculate the Return Of Investment(ROI) for Year I, II and III.

YEAR	1	2	3
COSTS	$55939	$37489	$37489
ESTIMATED Gain	$30000	$70000	$90000
ROI [(Gain – Cost) / Cost]*100 %	-46.37%	86.72 %	113.40%

Exercise 1: The data of a data science research project is transmitted through a high speed network (fiber-optic cables) and provide a bandwidth of 56 Gbps.

a) How long does it take to transfer the 35 PB (1 PetaBytes = 2^{50} Byte) through a 56 Gbps network?
b) What will be the best choice of network service (Cloud or Own Network Infrastructure) and why?

Solution:

56 Gbps bandwidth = 56 * 2^{30} b / s

= 7 x 2^{30} Bytes / s (since, 1 Byte = 8 bits)

Duration of transmission = 35 x 2^{50} Bytes / 7 x 2^{30} Byte/s = 5 x 2^{50-30} = 5 x 2^{20} sec

= 5 * 1024 * 1024

= 5,242,880 s

= 87,381 m

= 1456 h

= 24.1 d

= Approx 24 days

It will take approximately 24 days

1 K Byte = 1024 = 2^{10} Byte

1 MByte = 2^{10} K byte = 2^{10} * 2^{10} Byte = 2^{20} Byte

1 GB = 2^{10} Mbyte = 2^{10} * 2^{10} K Byte = 2^{10} * 2^{10} * 2^{10} Byte = 2^{30} Byte

1 TB = 2^{40} Byte

1 PB = 2^{50} Byte

1 ZB = 2^{60} Byte