Answers to Practice Spirometry Assignment: Assume it was collected from a person who weighed 155 lbs

***NOTE: SCALE may be a bit altered due to changes in paper size as it goes from paper to .prd file to your printer!***

Typical Values for 155 lb (70kg) person: (-10% for a female because they weigh a bit less)

TV=0.5 L IRV=3.0 L ERV=1.2 L VC= 0.5 + 3.0 + 1.2 = 4.7 L

Breathing Rate: 12 breaths/min Minute Vent. Rate = 12 breaths/min X 0.5 L/breath = 6 L/min

*Answers: Remember that these are +/- about 5-10% depending on how you lined up your rulers and how the paper was sized when it was printed.*

Scale (millimeters) will also change a bit when you print.

1) Tidal Volume: 16 mm X 41ml/1mm = 656 ml = 0.66 liter

Yes this is a bit larger than normal, yes it would be “best to have measured and average five separate breaths.

2) Breathing Rate: 3 breaths/45mm X 480 mm/minute = 32 breaths/minute

[ 8 mm/second X 60 seconds/minute = 480 mm/minute]

Yes it would be “best to have measured and average five separate breaths.

3) Inspiratory Reserve Volume: What you can inhale on top of a small tidal inhalation.

IRV= 47 mm X 41 ml/mm = 1,927 ml = 1.97 L

Yes this value is a bit smaller than normal

4) FEV1 = 71 mm X 41 ml/mm = 2,911 ml = 2.91 L

Find the point that is one second after the point on the volume curve where you started to exhale. This is 8 mm over to the right (assuming a 480 mm/min paper speed right?) of the vertical dashed line. This point is 71 mm below where the volume was when FORCED MAXIMAL EFFORT exhalation began…so 71 X 41 = 2.91 L

**You can make easy assessments about the meaning of FEV1 unless you know the Vital Capacity.**

5) ERV= 28 mm X 41 ml/mm = 1,148 ml = 1.15 L

This is a bit larger than the normal expected value of 1.2 liters

6) Vital Capacity= VC = 0.66 L + 1.93 L + 1.15 L = 3.74 L

This is a bit less that the typical value on 5 L.

**Remember that this is NOT the total capacity because there is still a significant residual volume (trachea, bronchi, non-collapsed alveoli, etc) that has not been measured on this tracing.**

**Total Lung Capacity = VC + Residual Volume (typically about 1.2 liters) TLC= 3.74 + 1.2 = 4.84 L**

7) MRV = TV X Breathing Rate = 0.66 L/ tidal breath X 32 breaths/minute = 26.12 Liters/minute

Yes this is a bit larger than normal

8) FEV1 expressed as a percentage of Vital Capacity: Do you have reason to suspect an airway obstruction?

FEV1/VC X 100 = percent 2.9 L/3.74 L X 100 = 78%

Normal is 80 to 90%, so a 78% %FEV1 would be borderline….maybe the person is experiencing asthma.

As airways become narrow, the radius is reduced and because flow is proportional to the radius to the fourth power, airflow out of the lung is slower than normal for a person experiencing asthma.