**Unit 1 Diagnostic Test**

1.

A child stands on a bathroom scale and doesn’t touch anything else. The bathroom scale reads 80 lb.

The child remains on the bathroom scale, but with a finger from one hand pulls vertically upward on a spring scale that is hooked to a table. The spring scale reads 10 lb.

Scale

Bathroom scale reading = 80 lb

Scale

Spring scale

reading = 10 lb

While the child pulls on the spring scale with the finger, the bathroom scale should now read

60 lb\_\_\_\_ 70 lb\_\_\_\_\_ 75 lb\_\_\_\_\_ 80 lb\_\_\_\_\_ 85 lb\_\_\_\_\_ 90 lb\_\_\_\_ 100 lb\_\_\_\_\_\_

2.

Four scales are attached as shown to the ceiling and to 2 blocks with weights shown. Neglect the weights of the scales.

Determine the force readings in each of the scales.

Scale A

Scale B

Scale C

Scale D

3 lb

4 lb

Ceiling

(a)

Scale A: 1.5 lb, Scale B: 1.5 lb, Scale C: 2 lb, Scale D: 2 lb

(b)

Scale A: 3 lb, Scale B: 3 lb, Scale C: 4 lb, Scale D: 4 lb

(c)

Scale A: 7/4 lb, Scale B: 7/4 lb, Scale C: 7/4 lb, Scale D: 7/4 lb

(d)

Scale A: 7 lb, Scale B: 7 lb, Scale C: 4 lb, Scale D: 4 lb

(e)

Scale A: 7/2 lb, Scale B: 7/2 lb, Scale C: 2 lb, Scale D: 2 lb

3.

A ball is rolling on a low friction surface. Someone starts a clock. You observe the ball rolling freely (untouched) while the clock registers between 10 sec and 30 sec. You look away for a short while and then you again look at the ball and observe it rolling freely (untouched) while the clock registers between 50 s and 70 s.

While you were not looking, the ball might have been tapped in these different ways



Tap on Left Side

Tap on Right Side

Here are the positions of the ball at several times (listed in seconds). The vertical lines are equally spaced.

50

30

10

70

60

20

What if anything might have happened to the ball while you were looking away (between 30 seconds and 50 seconds) ?

(a) The ball wasn’t tapped at all.

(b) The ball was tapped on the left side.

(c) The ball was tapped on the right side.

(d) The ball was tapped on the left side, and then tapped on the right side.

(e) The ball was tapped on the right side, and then tapped on the left side.

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A ball is rolling on a low friction surface. Someone starts a clock. You observe the ball rolling freely (untouched) while the clock registers between 10 sec and 30 sec. You look away for a short while and then you again look at the ball and observe it rolling freely (untouched) while the clock registers between 50 s and 70 s.

While you were not looking, the ball might have been tapped in these different ways



Tap on Left Side

Tap on Right Side

Here are the positions of the ball at several times (listed in seconds). The vertical lines are equally spaced.

70

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50

20

10

30

What if anything might have happened to the ball while you were looking away (between 30 seconds and 50 seconds) ?

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(b) The ball was tapped on the left side.

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Tap on Left Side

Tap on Right Side

Here are the positions of the ball at several times (listed in seconds). The vertical lines are equally spaced.

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