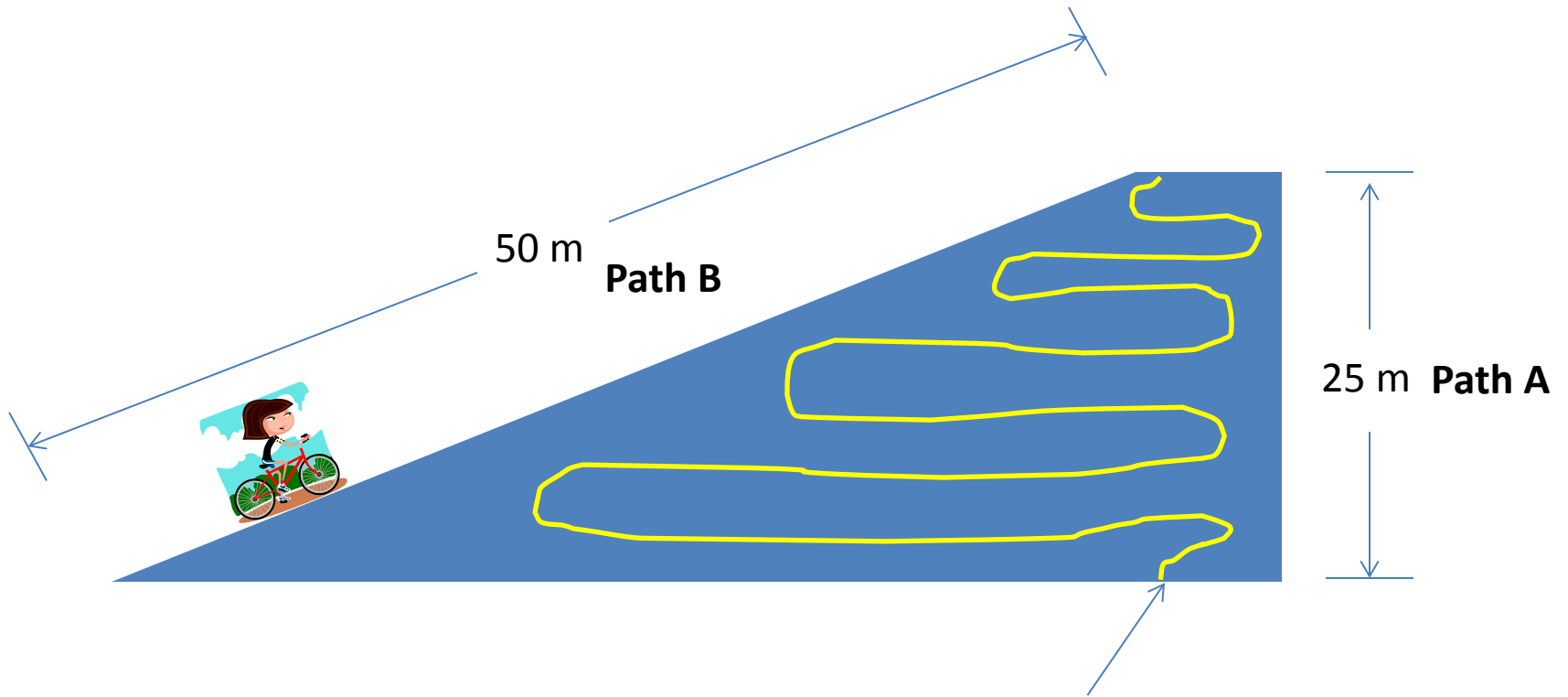


5.5 Review Questions, #4

Solution

Draw a Sketch!



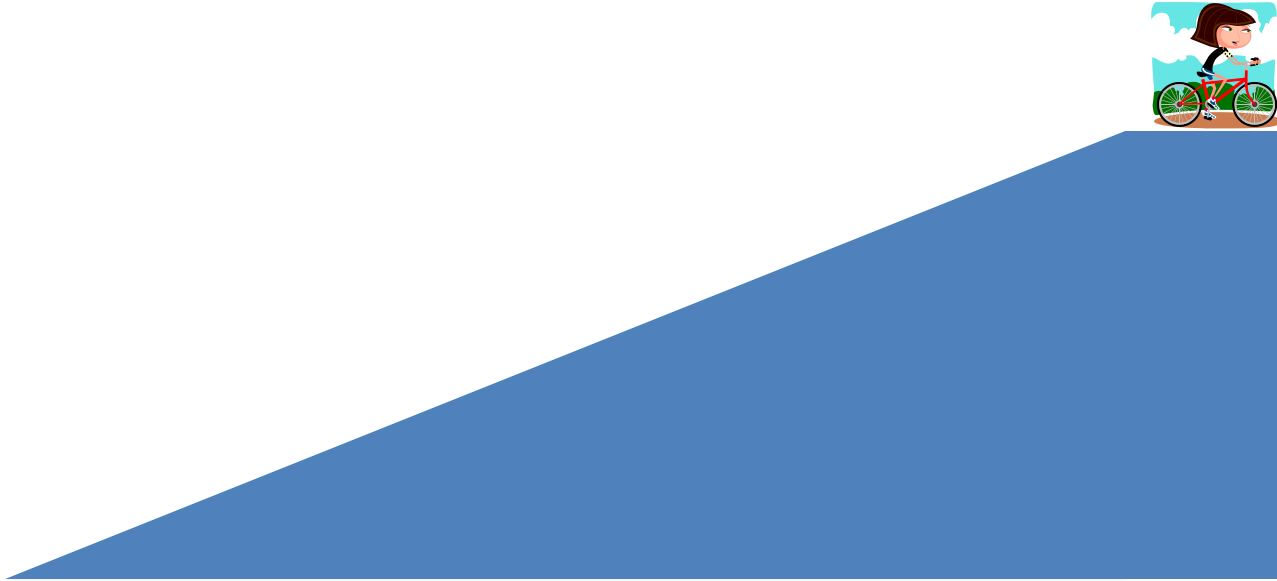
Weight = 550 N

(remember, weight = mg . That means her MASS = 55 Kg)

Path C

100 winding meters long.

Solution



- Once she gets to the top of the hill, what will she have at the top that she didn't have at the bottom? **PE!**
- What Physics thing does she have to do to give her (and her bike) PE? **Work!**
- Work done = PE gained = $mgh = (55 \text{ Kg})(10 \text{ m/s/s})(25 \text{ m}) = \mathbf{13,750 \text{ J}}$
- Does it matter what path she took to get up there? **NO!**
- The **Work done** has to be equal to the **PE gained no matter which path she took!**

Solution

a. 13,750 J

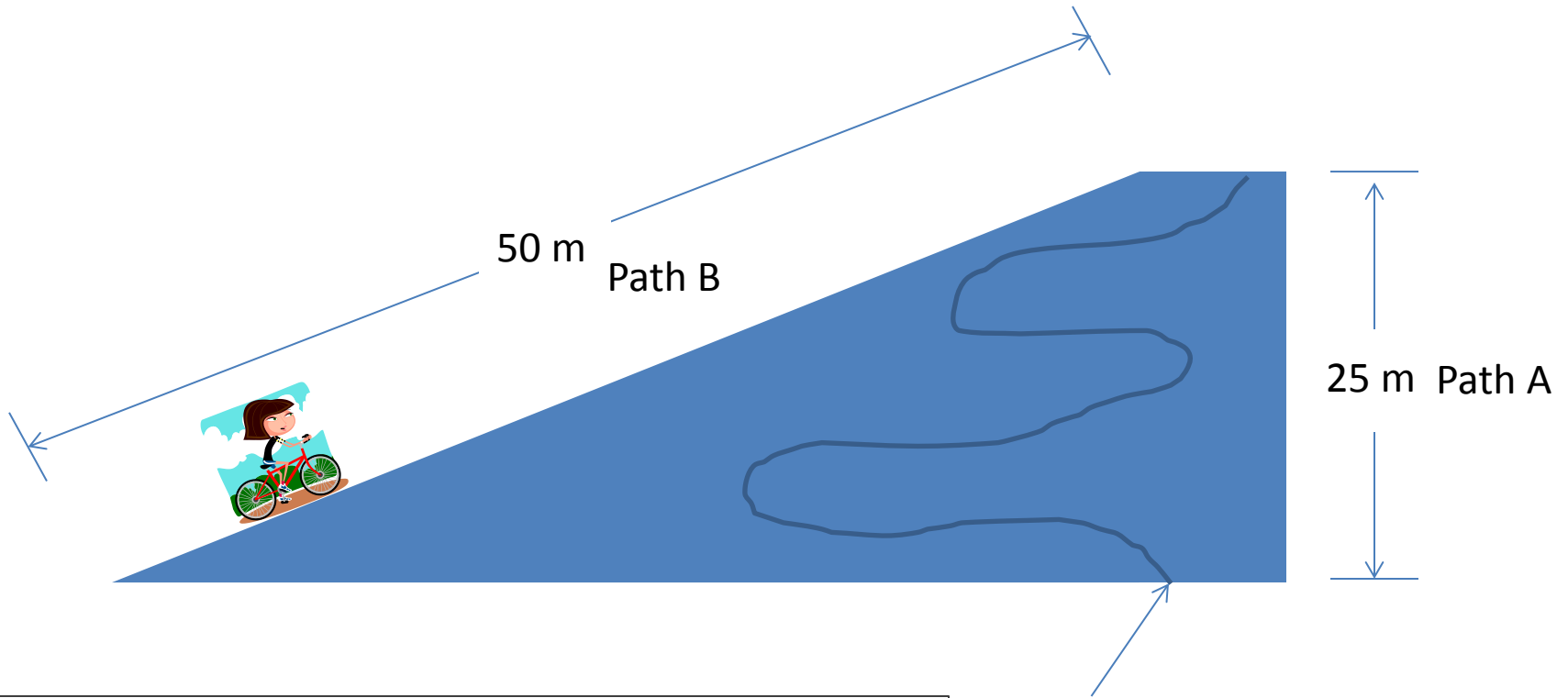
b. 13,750 J

c. 13,750 J

d. 13,750 J

Continue...

Solution



While she does the same WORK no matter which path she takes, she will use BIG FORCE to CARRY her bike up path A; she will use little force to pedal up the BIG DISTANCE of Path C.

Path C
100 winding meters long.

Solution

$$\text{PE gained} = \text{Work done} = F \times d$$

e. For Path A:

$$13,750 \text{ J} = F \times 25 \text{ m}$$

$$F = 550 \text{ N}$$

f. For Path B:

$$13,750 \text{ J} = F \times 50 \text{ m}$$

$$F = 275 \text{ N}$$

g. For Path C:

$$13,750 \text{ J} = F \times 100 \text{ m}$$

$$F = 137.5 \text{ N}$$

Solution

g. Her KE at the top is **zero**. (she is stopped)

Solution

For questions i – q:

i. 1/2 way down she has 1/2 the PE: **6,875 J**

j. ...the other 1/2 has gone to KE: **6,875 J**

k. 1/5 of the way down, she has 1/5 less PE than she had at the top: PE = **11,000 J**

l. 1/5 of the PE she had at the top is now KE: **2,750 J**

m. 4/5 of the way down, she has 1/5 of the PE she had at the top: PE = **2,750 J**

n. 4/5 of the PE she had at the top is now KE: **11,000 J**

Solution

For questions i – q:

o. PE at the bottom of the hill is **zero**. (All the height is gone).

p. All the PE at the top is now KE at the bottom: **13,750 J**

q.

Energy (top) = Energy (4/5 of the way down)

PE(top) = KE (4/5 of the way down)

$$mgh = \frac{1}{2} mv^2$$

$$gh = \frac{1}{2} v^2$$

$$(10 \text{ m/s/s})(\mathbf{20} \text{ m}) = \frac{1}{2} v^2$$

$$20 \text{ m/s} = v$$

(remember, the top of the hill is **20** m above the point 4/5 of the way down. It's the height that matters)