Math In The Movies - Jurassic Park Solution

Question 1

If the boat comes once per week, calculate how many meat eskies we will need from each boat trip:

$$\#eskies = \#trex \times meat\ per\ day\ per\ trex \times \#days\ /\ meat\ per\ esky$$

$$\#eskies = 13 \times 40 \times 7\ /\ 80$$

$$\#eskies = 45.5$$ **(1 mark)**

Next we can scale up the amount of food required:

$$Food\ per\ day\ per\ herbivore = food\ per\ elephant\ per\ day \times weight\ ratio$$

$$Food\ per\ day\ per\ herbivore = 120\ kg \times 20\ /\ 2$$

$$Food\ per\ day\ per\ herbivore = 1200\ kg$$

Now we can find how much food the boat needs to bring in each week:

$$Elephant\ feed\ required = \#herbivores \times vegetation\ per\ day\ per\ herbivore \times \#days$$

$$Elephant\ feed\ required = 180 \times 1200 \times 7$$

$$Elephant\ feed\ required = 1512000\ kg$$

$$Elephant\ feed\ required = 1512\ tonnes$$ **(1 mark)**

Question 2

Calculate the total length of fencing for the circular, rectangular and triangular paddocks:

$$Total\ perimeter = 3 \times circle\ perimeter + rectangle\ 1 + 2 \times rectangle\ 2 + triangle$$

$$Total\ perimeter = 3 \times 2 \times PI \times r + 2 \times (L1 + W1) + 2 \times 2 \times (L2 + W2) + 3 \times triangle\ side\ length$$

$$Total\ perimeter = 3 \times 2 \times PI \times 400 + 2 \times (1200 + 400) + 2 \times 2 \times (750 + 400) + 3 \times 300$$

$$Total\ perimeter = 7536 + 3200 + 4600 + 900$$

$$Total\ perimeter = 16236\ m\ or\ 16.236\ km$$ **(1 mark)**

The fences have an average height of 8 metres, so we can calculate the area of fencing:

$$Fencing\ area = fencing\ length \times fencing\ height$$

$$Fencing\ area = 16236 \times 8$$

$$Fencing\ area = 129888\ m^2$$ **(1 mark)**

Question 3

First calculate how long it will take for you to reach the triceratops (convert the speed to the requested unit of km/hr):

$$Time\ to\ safety\ =\ distance\ /\ speed$$

$$Time\ to\ safety\ =\ 300\ m\ /\ (35\ km/hr)$$

$$Time\ to\ safety\ =\ 300\ m\ /\ (35\ km/hr\ \times\ 1000\ m/km\ /\ 3600\ s/hr)$$

$$Time\ to\ safety\ =\ 30.86\ seconds$$ **(1 mark)**

To find whether you're safe from the T-rex, you can calculate how long it will take to get from its current position to the Triceratops herd (convert the speed to the appropriate units):

$$T-rex\ time\ =\ distance\ /\ speed$$

$$T-rex\ time\ =\ (300\ m\ +\ 150\ m)\ /\ (45\ km/hr)$$

$$T-rex\ time\ =\ 450\ m\ /\ (45\ km/hr\ \times\ 1000\ m/km\ /\ 3600\ s/hr)$$

$$T-rex\ time\ =\ 36\ seconds$$ **(1 mark)**

The T-rex will get to the herd a few seconds after you. Calculate the time for the raptor, using the same formula:

$$Raptor\ time\ =\ distance\ /\ speed$$

$$Raptor\ time\ =\ (300\ m\ +\ 500\ m)\ /\ (75\ km/hr)$$

$$Raptor\ time\ =\ 800\ m\ /\ (75\ km/hr\ \times\ 1000\ m/km\ /\ 3600\ s/hr)$$

$$Raptor\ time\ =\ 38.4\ seconds$$ **(1 mark)**

Apparently the raptor will be just behind the T-rex, so you have got a chance at safety.