

HILLCREST HIGH SCHOOL



Grade 11 Mathematical  
Literacy Exam  
Paper 1  
June 2016

Examiner: Mr. Hopkins

Moderator: Mrs. Leuschke

MARKS: 100

TIME: 2 hours

INSTRUCTIONS

1. Write your name and your teacher's name on your answer book.
2. This question paper consists of 5 questions. Answer ALL the questions.
3. Number the questions correctly according to the number system used in this question paper.
4. Start EACH question on a NEW page.
5. You may use an approved calculator (non-programmable and non-graphical), unless stated otherwise.
6. Show ALL calculations and steps clearly.
7. Round off ALL final answers to TWO decimal places, unless stated otherwise.
8. Indicate units of measurement, where applicable.
9. Maps and diagrams are NOT necessarily drawn to scale, unless otherwise stated.

## Question 1

Read the following extract and answer the questions that follow:

The **Iditarod Trail Sled Dog Race** is an annual long-distance sled dog race run in early March from Anchorage to Nome, which takes place entirely in the US state of Alaska. Musher and a team of 16 dogs cover a distance of 1000 miles. The Iditarod began in 1973 as an event to test the best sled dog mushers and teams but evolved into today's highly competitive race. The current fastest winning time record was set in 2014 by Dallas Seavey with a time of 8 days, 13 hours, 4 minutes, and 19 seconds. Dallas Seavey was also the youngest musher to win the race at the age of 25, while, at the age of 53, Dallas' father, Mitch Seavey, was the oldest person to ever win the race with a time of 9 days, 15 hours, 6 minutes and 54 seconds.



- 1.1) Convert the length of the Iditarod Trail from miles to kilometers. (Note: There are 1.652 kilometers in 1 mile). (2)
- 1.2) Convert your answer from question 1.1 into meters. (2)
- 1.3) The 2016 Iditarod Trail was run and completed in March. How many times has the race been Run since it first started. (Refer to the article) (2)
- 1.4) A musher trains a team of 16 dogs every second day. A single training run usually covers about 40 kilometres of trails. How many kilometres of trails will that musher train in a 30 day month? (3)
- 1.5) In tough terrain, a musher and his team cover 4 kilometres of trail each hour, how many hours will it take them to complete the 16 kilometre training run? (2)
- 1.6.1) Each musher must pay a \$1750 entry fee to be part of the Iditarod. If 84 mushers have entered the race, how much money in entry fees will Iditarod officials collect? (2)
- 1.6.2) If 18 mushers withdraw from the race before race day, how much money will the organisers lose altogether? (2)
- 1.8) Along the Iditarod trail, there are 27 checkpoints. If a musher has gone through  $\frac{2}{3}$  of the checkpoints, how many of the 27 checkpoints has she passed through? (2)
- 1.9) Convert Dallas Seavey's winning time of 8 days, 13 hours, 4 minutes and 19 seconds into an answer of seconds. (4)
- 1.10) According to the article, how old would Mitch Seavey have been when his son, Dallas, was born? (2)
- 1.11) How much slower was Mitch Seavey's best time in comparison the that of his son Dallas's best time? Present your answer as days, hours, minutes and seconds. (4)

1.12) Teams generally race through blizzards causing whiteout conditions, sub-zero temperatures and gale-force winds which can cause the wind chill to reach  $-70^{\circ}\text{F}$ . Use the formula : **Degrees Celcius = (Degrees Farenheit – 32)  $\div$  1.8** to convert the mentioned temperature to Degrees Celcius. Round off to the nearest degree. (3)

1.13) The 4<sup>th</sup>, and longest stage of the race is run from the town of Cripple to the town of Ruby, a distance of 198 kilometers. The record time for stage four is 6 hours. Calculate the average speed of the winning dogs on stage four. (Use the Formula: Speed =  $\frac{\text{Distance}}{\text{Time}}$  ) (3)

(33)

Question 2

Actively mushing huskies are capable of burning nearly 7 000 calories per day. During the race, Mushers must keep a careful eye on the dogs' weight so each dog can perform optimally. Mushers mix the following ingredients and feed it to their dogs over an 18 hour racing day. (Note: The dogs run for 18 hours in a 24 hour period)

Ingredient (Per dog)	Mass (Per dog)	Cost (Per dog)
Raw red meat	3 pounds (lb)	\$ 6
Lard/Fat	15 ounces (oz)	\$ 1
Cooked Fish	2 pounds (lb)	\$ 3
Kibble (Dog biscuits)	1 pounds (lb)	\$ 0.50



2.1) Calculate the total weight of food that a mushing dog would consume over an 18 hour racing day. Leave your answer in pounds and ounces. (2)

2.2) Convert your answer from 2.1 into kilograms and grams. Round off to two decimal places. (Note: 1lb = 0,4536 kg and 1oz = 28.4 grams) (5)

2.3) Dallas Seavey estimated he would finish the Iditerod in 10 days. Calculate the weight of dog food that he would have set off with on the first day for all 16 dogs. Write your answer in kilograms and grams. (Use your rounded off answer from question 2.2 to answer this question) (4)

- 2.4) Calculate the cost of feeding one mushing dog per day in US dollars. (Use the above table) (2)
- 2.5.1) In 2015 the rand dollar exchange rate was \$1 = R 13.38 Calculate the cost of feeding one mushing dog per day in Rands. (Use your answer from question 2.4 to answer this question) (3)
- 2.5.2) A sledding team consists of 16 dogs. Calculate the cost per day to run the team in Rands. (2)
- 2.5.3) Dallas Seavey completed the Iditarod in 8 days. Calculate the total cost in Rands to feed all his dogs over the entire race. (2)
- 2.6) Each dog on an Iditarod team burns about 7000 calories of food a day. If there are 16 dogs on an Iditarod team, how many calories in all does that team burn? (2)
- 2.7) A hamburger will help give you an idea how much food a sled dog consumes...A hamburger has about 250 calories. If sled dogs ate hamburgers, how many hamburgers would a dog have to eat in order to consume 7,000 calories in a day? (2)
- 2.8) Your average house dog burns up 1,140 calories a day. How many more calories does an Iditarod sled dog burn? (2)
- 2.9) For a quick burst of energy, mushers feed their dogs 'honey sticks'. A honey stick is similar to a biscuit comprising of 20% honey, 8% peanut butter, 40% lard and 32% kibble.
- 2.9.1) Represent the ingredients of the honey stick as a simplified ratio. (2)
- 2.9.2) If the mass of one honey stick is 200 grams, how many grams of peanut butter are there in the honey stick? (3)

(31)

---

### Question 3

Antarctica Storms, an extreme outdoor clothing company, have agreed to sponsor David Jameson, a quadriplegic musher. Antarctica Storms will give David the indicated amount of money in the tariff table below according to the amount of Miles he completes of the Iditarod. David will hand over the amount he achieves to the Ottawa children's hospital.

Distance in Miles	Amount per Mile
0 - 100	\$ 0.50
101 - 300	\$ 2.50
301 - 600	\$ 5.50
601 - 900	\$ 10.90
9001- 1000	\$ 15.00

3.1) David retired from fatigue after completing 880 Miles. Calculate the amount that he raised for the children’s hospital in Dollars. (5)

3.2) With all of David’s other sponsors, he raised a total of \$15 000 for the children’s hospital. The hospital invested the full amount at a compound interest rate at 8 percent for 3 years in order to grow the money. Calculate the amount of interest that the children’s hospital will receive when this investment matures. Show all working. (No formula may be used.) (3)



(8)

Question 4

Dry land sledding is practiced in countries where people have a passion for dog sledding but where there is little or no annual snowfall. Sleds are constructed using an aluminum cart attached to wheels. The Western Cape (South Africa) has one of the biggest dry land sledding leagues in the world, in a country where snow seldom falls.



The rate of inflation over the last few years has made it very expensive for enthusiasts to pursue this sport in South Africa.

Refer to the average rate of inflation table for the years 2011 to 2015 and answer the questions that follow.

Year	2011	2012	2013	2014	2015
Rate of inflation	xxxxxxx	6.5%	8%	8.2%	7%
Amount Dry land sled increased in Rands	xxxxxxx	R 234	B	R 339. 54	D
Cost of Dry Land Sled in Rands	R 3 600	A	R 4140. 72	C	E

4.1) Calculate the value of the missing letters A,B,C,D and E. Show all calculations in your answer booklet and round off each answer to two decimal places. Present your answers in a clear and logical format. (10)

- 4.2) Calculate the average rate of inflation between the years 2013 and 2015. (Include 2013 and 2015 in your calculation) (3)
- 4.3) The indicated amounts in the above table do not include VAT. What would the 2011 price of the dry land sled have been should VAT have been included? (VAT amounts to 14%) (4)
- 4.4) It is compulsory to wear a helmet for protection when dry land sledding. Calculate the Vat portion of a helmet that costs R 599 (Vat inclusive price). Round your answer to two decimal places. (4)

---

(21)

---

### Question 5

Huskies are hyperactive dogs and quickly become bored and destructive if not exercised sufficiently. Some owners construct running wheels in order to exercise their dogs. (Much the same as a hamster wheel)



- 5.1) The indicated training wheel has a diameter of 2 meters. Calculate the radius. (2)
- 5.2) Calculate the circumference of the training wheel. Use the value of 3.14 as  $\pi$  and the formula  $C = 2\pi r$  to find your answer. (2)
- 5.3) The strip of metal that the dog runs on needs to be 1 meter wide. Calculate the flat surface area of metal that would be to construct such a wheel. (Note:  $A = L \times B$ ) (3)

---

(7)  
END

---