YEAR 12 Essentials Mathematics
Semester 2 2021
Longitude/Latitude & Time Zones

Baldivis Secondary College

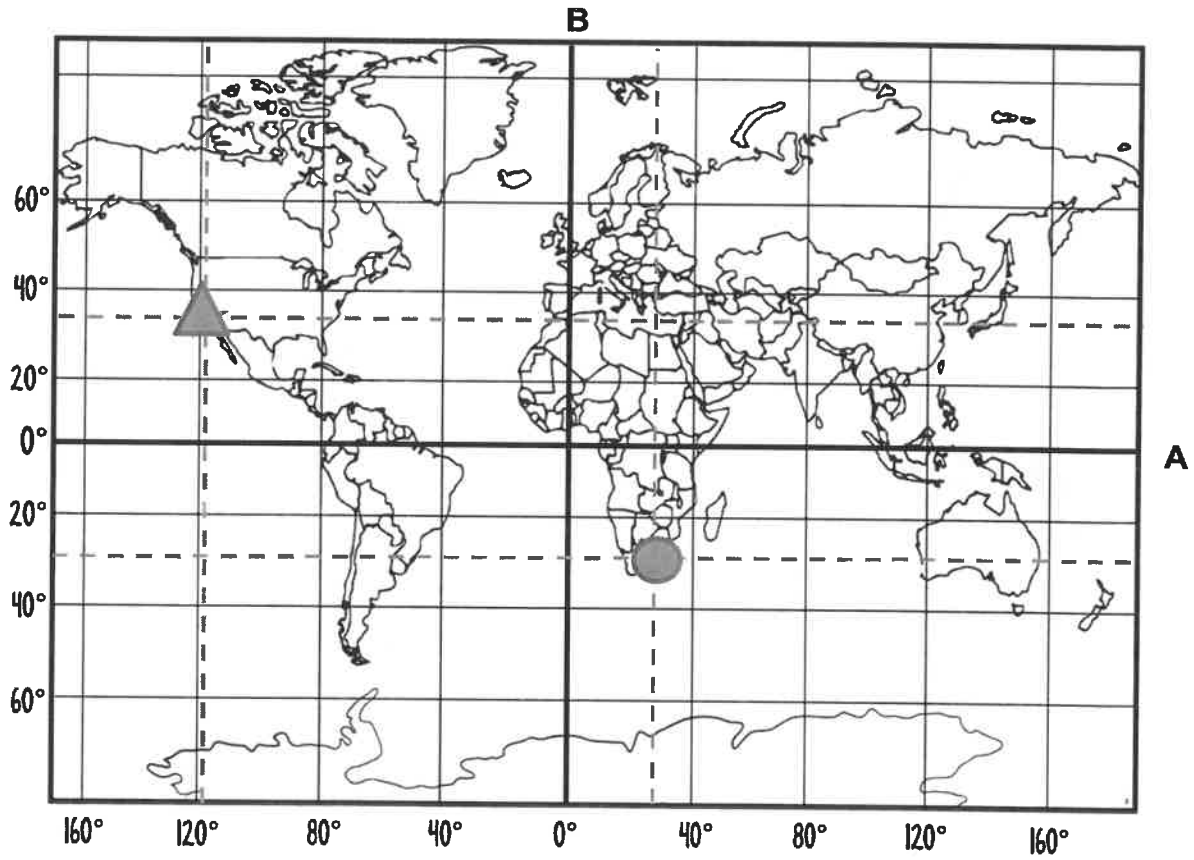
Name: Answers

Mark: _____/ 31 marks

Full working out must be shown to get full marks.
Attempt all questions

Resources allowed:
1 A4 page, (1 side) of hand written notes, ruler, calculator

1. Use the map of the world to answer the following questions: (4 marks)



(a) Name the significant line labeled A. Equator ✓

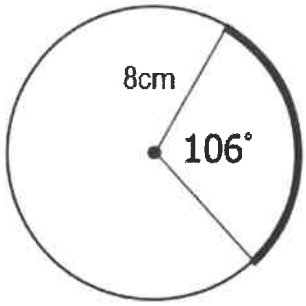
(b) Name the significant line labeled B. Prime meridian or Greenwich meridian ✓

(c) Los Angeles is located on the map with a triangle. What are the coordinates of Los Angeles?
35°N, 118°W (+/- a few degrees) ✓

(d) South Africa is located on the map with a circle. What are the approximate coordinates of South Africa?
30°S, 30°E (+/- a few degrees) ✓

2. Calculate the arc length (shown in bold) in the following circles (Answer in cm) (5 marks)

(a)

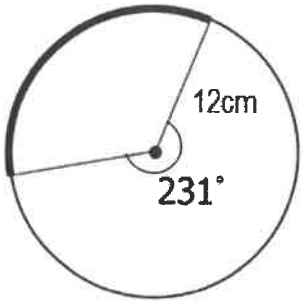


$2 \times \pi \times 8cm \times \frac{106°}{360°}$ ✓ Substitution into formula

$\Rightarrow 14.80cm$ (2dp) ✓ Answer

$-\frac{1}{2}$ cm not stated

(b)



$360 - 231 = 129$ ✓ Degrees

$2 \times \pi \times 12cm \times \frac{129°}{360°}$ ✓ sub into formula

$\Rightarrow 27.02cm$ (2dp) ✓ Answer

$-\frac{1}{2}$ cm not stated

3. Find the **arc <u>angle</u>** between Bali (5°S, 115°E) and Mandurah (35°S, 115°E) (1 Mark)

$35° - 5°$

$= 30°$ ✓ Answer

4. *A* (23°N, 121°W) and *B* (65°N, 121°W) are two points on the surface of the Earth. Findthe distance to the nearest kilometer between the points *A* and *B*.
(Approximate the radius of the Earth as 6 400km) (3 Marks)

$65° - 23° = 42°$ ✓ to calculate for 'θ'

$2 \times \pi \times 6400 \times \frac{42°}{360°}$ ✓ sub into formula

$\Rightarrow 4691$ Km

✓ Answer

$-\frac{1}{2}$ Km not Stated

5. Find the distance between Stockholm (59°N 18° E) and Cape Town (34°S 18°E) correct to the nearest kilometer.
(Approximate the radius of the Earth as 6 400 km) (3 Marks)

$59° + 34° = 93°$ ✓ to calculate for 'θ'

$2 \times \pi \times 6400 \times \frac{93°}{360°}$ ✓ sub into formula

$\Rightarrow 10388$ Km

✓ Answer

$-\frac{1}{2}$ Km not stated

6. Using the Time Zones table below answer the following questions (4 Marks)

City	Time
Sydney	GMT+10
Melbourne	GMT+10 +1
Adelaide	GMT+9:30
Perth	GMT+8
Darwin	GMT+9:30
Brisbane	GMT+10
Hobart	GMT+10

a) If it is 3:51 PM in Sydney, what time would it be in Darwin?

3:51 pm - 30 mins = 3:21 pm

✓ Subtraction ✓ Answer

b) If it is 11:45 pm in Perth, what time would it be in Melbourne? (considering daylight savings is in effect).

11:45 pm + 3 hours = 2:45am

✓ Addition ✓ Answer

7. Han, who is in Canberra (GMT +10) at the moment, has an interview over Skype with the human resources manager of an American trading firm scheduled for 3 pm on Monday, New York (GMT -5) time. (3 Marks)

a) Calculate the time difference between the two cities.

10+5 = 15 hours

✓ Answer

b) Find the time in Canberra when it is 3pm on Monday in New York.

3:00 pm + 15 hours = 6:00AM in Canberra

✓ Answer

c) What day will the interview fall on in Canberra?

Tuesday ✓ Answer

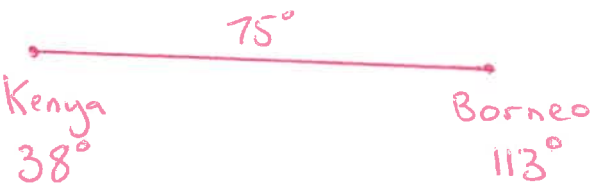
8. An aircraft travels at an average speed of 913 km/h. It departs from a town in Kenya (0°, 38° E) on Tuesday at 10 pm and flies east to Borneo (0°, 113° E). (8 marks)

a. What is the distance, to the nearest kilometre, between the two towns? (Assume the radius of the earth is 6400km)

$113° - 38° = 75°$

$\Rightarrow 2 \times \pi \times 6400 \times \frac{75°}{360°}$ ✓ Substitution into formula

$\Rightarrow 8378$ Km ✓ Answer



b. How long will the flight take? (Answer to the nearest hour)

$\text{Time} = \frac{\text{Distance}}{\text{Speed}}$

$= 8378 \div 913$ ✓ calculations

$= 9.176341 \Rightarrow 9$ hours ✓ Answers

c. What will be the local time in Borneo when the aircraft arrives? (NOTE: Kenya is GMT+3 and Borneo is GMT+8)

$8 - 3 = 5$ hour difference. ✓ Time difference

Plane leaves @ 10pm Tues ✓

$\Rightarrow$ 10pm + 5hrs = 3am Wed at time of departure

$\Rightarrow$ 3am + 9hrs = 12pm wednesday

✓ travel time ✓ Answer

$-\frac{1}{2}$ not stating pm/ Wednesday

END OF TEST