



BRIGIDINE COLLEGE

MATHEMATICS YR 10 HALF-YEARLY EXAM 2017 TIME ALLOWED: 60 minutes Section 5.2

Student:

Teacher:

ALL SECTIONS TO BE ANSWERED ON THE QUESTION PAPER IN THE SPACE PROVIDED.

Section	Marks	Student's mark
Trigonometry and Ch 1	20	
Geometry & Measurement	20	
Financial Mathematics	20	
Total		

All necessary working **MUST** be shown in Short/Extended response sections.
Black/blue pen **MUST** be used for all working and answers.
Calculator allowed.

Student name: _____

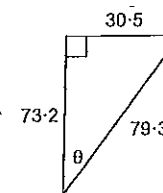
Teacher: _____

SECTION 1: TRIGONOMETRY

20 MARKS

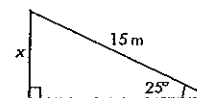
MULTIPLE CHOICE: CIRCLE THE CORRECT ANSWER.

- Find the value of $\cos 46^\circ$, correct to 4 decimal places.
A. 0.7193 B. 1.6947 C. 0.5940 D. 0.6532
- Which equation could be used to find the value of θ ?



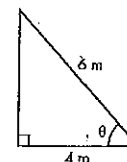
- A. $\cos \theta = \frac{73.2}{79.3}$ B. $\tan \theta = \frac{73.2}{30.5}$ C. $\sin \theta = \frac{73.2}{79.3}$ D. $\tan \theta = \frac{30.5}{79.3}$

- The correct length, to one decimal place, of the side marked x is:



- A. 13.6 m B. 6.3 m C. 7.0 m D. 3.16 m

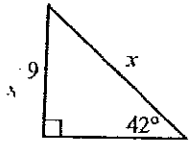
- Find the size of the angle marked θ .



- A. $41^\circ 49'$ B. $33^\circ 41'$ C. $56^\circ 19'$ D. $48^\circ 11'$

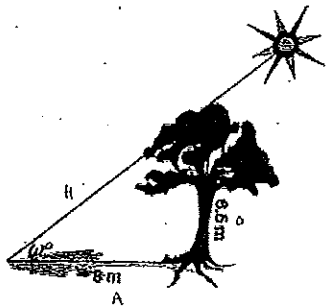
SHORT/EXTENDED ANSWER: SHOW WORKING

5. Find the value of x , correct to two decimal places.



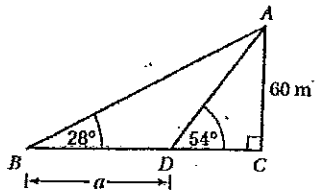
2

6. A 6.5 metre high tree casts a shadow 8 metres long. Calculate the angle at the sun's rays make with the ground. Round correct to the nearest minute.



2

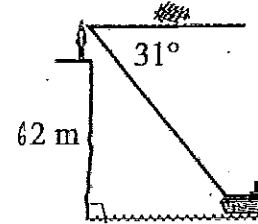
7. Find the value of a correct to 1 decimal place



4

8. Susan looked from the top of a cliff 62 m high and noticed a ship at an angle of depression of 31° .

a. Fill in the missing information from the diagram.

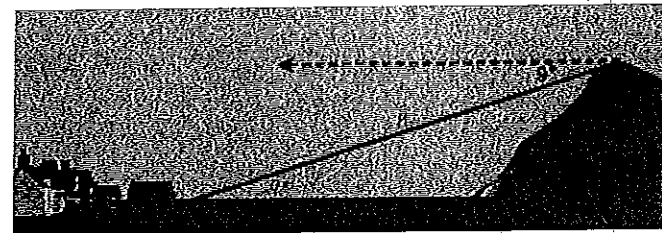


2

b. How far was the ship from the base of the cliff? Answer correct to one decimal place.

2

9. From the top of a 180 m hill, the angle of depression to a town is 9° . Calculate the horizontal distance of the town from the hill.



5

10. Michelle's car has a fuel economy of $8.5\text{L}/100\text{km}$. Michelle's fuel tank has a capacity of 55L . Find the maximum distance that Michelle can travel on a full tank of fuel.

2

11. If $m = \frac{1.6 \times 10^{-19}}{1.76 \times 10^{11}}$, write m in scientific notation correct to 1 decimal place.

1

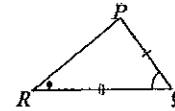
Student: _____ Teacher: _____

SECTION 2: GEOMETRY & MEASUREMENT

MULTIPLE CHOICE: CIRCLE THE CORRECT ANSWER

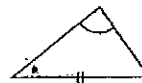
20 MARKS

1.



Which triangle below is congruent to PQR?

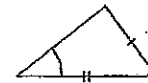
A.



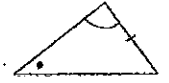
B.



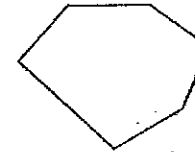
C.



D.



2. In the diagram shown the sum of the internal angles is equal to:



A. 540

B. 720

C. 900

D. 1080

3. A cube of side length 5cm has a total surface area of:

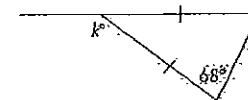
A. 25cm^2

B. 125cm^2

C. 100cm^2

D. 150cm^2

4. The value of k° in this diagram is:



A. 68°

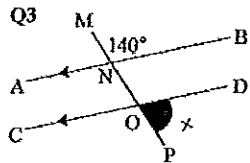
B. 44°

C. 118°

D. 136°

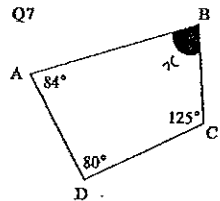
SECTION 2: SHORT/EXTENDED ANSWER: SHOW WORKING

5. Find the value of x and give reasons for your answer.



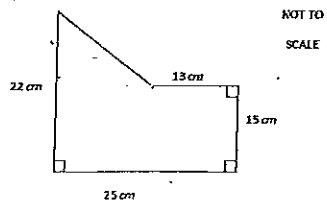
2

6. Find the value of x and give a reason for your answer.



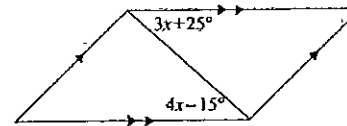
2

7. Calculate the area of the following shape?



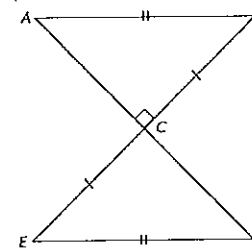
2

8. Find the value of x .



2

9. Prove that $\triangle ABC = \triangle DEC$



Reason

_____ = _____ (_____)

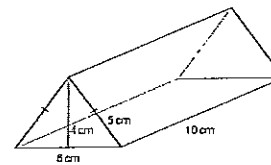
_____ = _____ (_____)

_____ = _____ (_____)

$\therefore \triangle$ _____ = \triangle _____ by _____

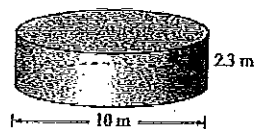
3

10. Find the surface area of the triangular prism.



2

11. A circular swimming pool has a diameter of 10 m and a depth of 2.3 m.



A. Calculate the volume of the pool to the nearest m^3

B. Calculate the number of litres of water required to fill the pool. ($1m^3 = 1000L$)

Student: _____ Teacher: _____

SECTION 3: FINANCIAL MATHEMATICS

MULTIPLE CHOICE: CIRCLE THE CORRECT ANSWER

20 MARKS

1. Sasha works in a computer shop. She is paid \$170 per week plus 12% of the amount of her sales. Calculate her pay in a week when she sells \$2 600 worth of goods.

- A. \$184.50 B. \$190.40 C. \$312 D. \$482

2. Angelo earns a gross salary of \$3978 per month. What will be his employer's monthly superannuation contribution, at a rate of 9.25 p.a. %?

- A. \$367.97 B. \$397.80 C. \$4345.97 D. \$4375.80

3. The marked price of a DVD player is \$450. Danny buys the DVD player at a sale for \$396. Calculate the percentage discount.

- A. 12% B. 14% C. 54% D. 88%

4. Which of the following is the highest annual salary?

- A. \$2224 per week B. \$4440 per fortnight C. \$9612 per month D. \$115 753 p.a

5. Equipment with an original value of \$192 000 is depreciated at 11% p.a. of the current value for seven years. The value of the equipment after that time period is closest to:

- A. \$44 160.00 B. \$84 924.16 C. \$86 419.88 D. \$91 833.00

SHORT/EXTENDED ANSWER: SHOW WORKING

6. Sandy invest \$1500 for 2 years at 5% simple interest per annum. Find the interest from this investment.

1

7. \$20 100 is invested at a rate of 6.9% compound interest, compounded annually. Find the value of the investment after 2 years, correct to two decimal places.

1

8. Mathew invests \$25 000 into a 2-year fixed term deposit that pays 8% p.a with interest compounded quarterly. Find the interest on this investment after 2 years, correct to the nearest whole number.

2

9. Josh is on a yearly salary of \$67 234. If he works a 38-hour week, what is his hourly rate to the nearest dollar?

1

10. The interest paid on a loan of \$35 000 with a flat interest rate of 6% pa interest was \$12 600. How long was the term of the loan?

2

11. Dora works for \$9.60 per hour for eight hours each day on Monday to Friday. She then works six hours over time on Saturday at time and a half. How much does Dora earn for the week's work?

2

12. Liv bought a laptop exactly 2 years ago for \$1780. It depreciates at 16% pa. How much did the laptop depreciate by?

2

13. Heather sells cars. She earns \$270 per week plus 5% commission on her total weekly sales. What does Heather earn in a week where her sales amount to \$8600?

1

14. Luke could invest \$1000 at a simple rate of 11% p.a. for 4 years or 10% p.a. compounded monthly for the same period of time. Which is the better investment and by how much?

3



BRIGIDINE COLLEGE

MATHEMATICS
YR 10 HALF-YEARLY EXAM 2017
TIME ALLOWED: 60 minutes
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Student: SOLUTIONS
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Student name: _____

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SECTION 1: TRIGONOMETRY

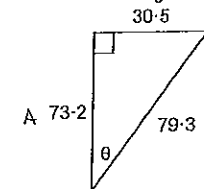
20 MARKS

MULTIPLE CHOICE: CIRCLE THE CORRECT ANSWER.

1. Find the value of $\cos 46^\circ$, correct to 4 decimal places.

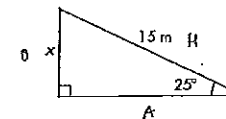
- A. 0.7193 **(B) 0.6947** C. 0.5940 D. 0.6532

2. Which equation could be used to find the value of θ ?



- (A) $\cos \theta = \frac{73.2}{79.3}$** B. $\tan \theta = \frac{73.2}{30.5}$ C. $\sin \theta = \frac{73.2}{79.3}$ D. $\tan \theta = \frac{30.5}{79.3}$

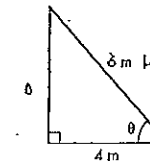
3. The correct length, to one decimal place, of the side marked x is:



$15 \sin 25^\circ$

- A. 13.6 m **(B) 6.3 m** C. 7.0 m D. 3.16 m

4. Find the size of the angle marked θ .

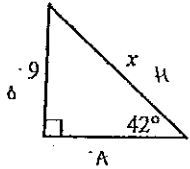


$\cos^{-1}(\frac{4}{8})$

- A. $41^\circ 49'$ B. $33^\circ 41'$ C. $56^\circ 19'$ **(D) $48^\circ 11'$**

SHORT/EXTENDED ANSWER: SHOW WORKING

5. Find the value of x , correct to two decimal places.



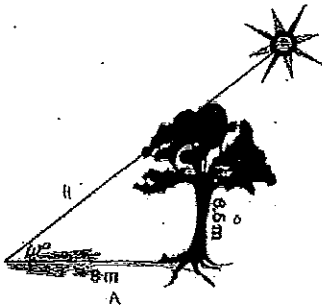
$$\frac{9}{x} = \sin 42^\circ$$

$$x = \frac{9}{\sin 42^\circ}$$

$$= 13.45$$

2

6. A 6.5 metre high tree casts a shadow 8 metres long. Calculate the angle @ the sun's rays make with the ground. Round correct to the nearest minute.



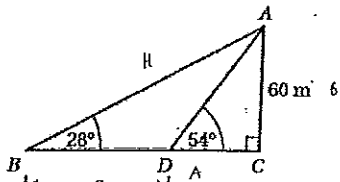
$$\tan w = \frac{6.5}{8}$$

$$w = \tan^{-1} \frac{6.5}{8}$$

$$= 39^\circ 6'$$

2

7. Find the value of a correct to 1 decimal place



$$\frac{60}{DC} = \tan 54^\circ$$

$$DC = \frac{60}{\tan 54^\circ}$$

$$\frac{60}{BC} = \tan 28^\circ$$

$$BC = \frac{60}{\tan 28^\circ}$$

$$BD = BC - DC$$

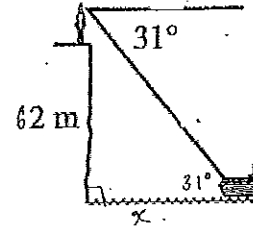
$$= \frac{60}{\tan 28^\circ} - \frac{60}{\tan 54^\circ}$$

$$= 69.3 \text{ m}$$

4

8. Susan looked from the top of a cliff 62 m high and noticed a ship at an angle of depression of 31° .

- a. Fill in the missing information from the diagram.



2

- b. How far was the ship from the base of the cliff? Answer correct to one decimal place.

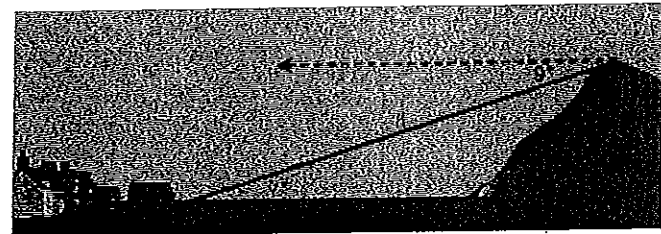
$$\frac{62}{x} = \tan 31^\circ$$

$$x = \frac{62}{\tan 31^\circ}$$

$$= 103.2 \text{ m}$$

2

9. From the top of a 180 m hill, the angle of depression to a town is 9° . Calculate the horizontal distance of the town from the hill.



$$\tan 9^\circ = \frac{180}{x}$$

$$x = \frac{180}{\tan 9^\circ}$$

$$= 1136 \text{ m}$$

5

10. Michelle's car has a fuel economy of $8.5\text{L}/100\text{km}$. Michelle's fuel tank has a capacity of 55L . Find the maximum distance that Michelle can travel on a full tank of fuel.

$$8.5\text{L} : 100\text{ km}$$

$$1\text{L} : \frac{100}{8.5} = 11.76\text{ km}$$

$$55\text{L} : 11.76 \times 55 = 647\text{ km}$$

2

11. If $m = \frac{1.6 \times 10^{-19}}{1.76 \times 10^{11}}$, write m in scientific notation correct to 1 decimal place.

$$9.1 \times 10^{-31}$$

1

Student: _____

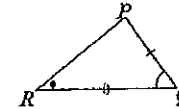
Teacher: _____

SECTION 2: GEOMETRY & MEASUREMENT

MULTIPLE CHOICE: CIRCLE THE CORRECT ANSWER

20 MARKS

1.

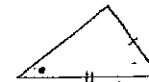


Which triangle below is congruent to PQR?

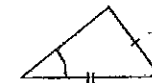
A.



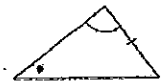
B.



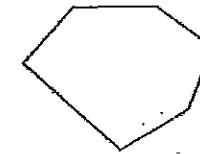
C.



D.



2. In the diagram shown the sum of the internal angles is equal to:



$$(n-2) \times 180$$

A. 540

B. 720

C. 900

D. 1080

3. A cube of side length 5 cm has a total surface area of:

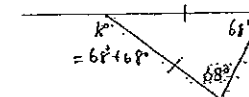
A. 25cm^2

B. 125cm^2

C. 100cm^2

D. 150cm^2

4. The value of k° in this diagram is:



A. 68°

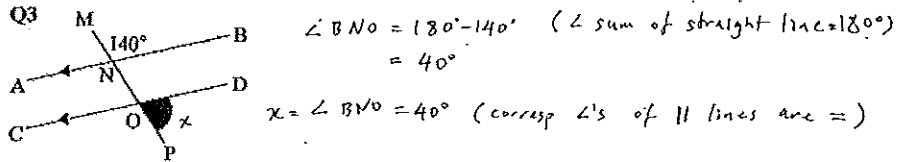
B. 44°

C. 118°

D. 136°

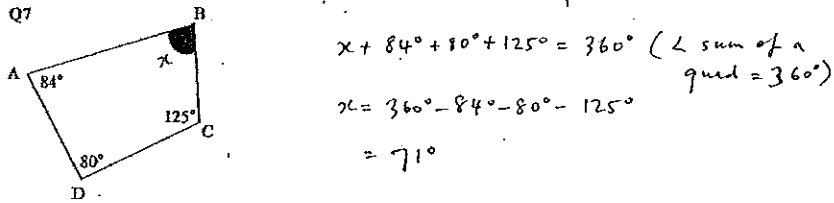
SECTION 2: SHORT/EXTENDED ANSWER: SHOW WORKING

5. Find the value of x and give reasons for your answer.



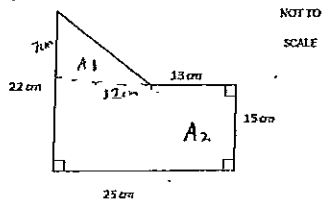
2

6. Find the value of x and give a reason for your answer.



2

7. Calculate the area of the following shape?



$$A_1 = \frac{1}{2} \times 12 \times 7 = 42 \text{ cm}^2$$

$$A_2 = 15 \times 25 = 375 \text{ cm}^2$$

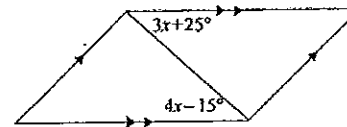
$$A = A_1 + A_2$$

$$= 42 + 375$$

$$= 417 \text{ cm}^2$$

2

8. Find the value of x .



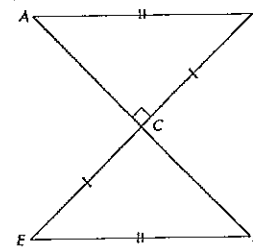
$$3x + 25 = 4x + 15$$

$$4x - 3x = 25 - 15$$

$$x = 10^\circ$$

2

9. Prove that $\triangle ABC \cong \triangle DEC$



Reason

$$\angle ACB = \angle ECD = 90^\circ \text{ (Vert Opp } \angle\text{'s =)}$$

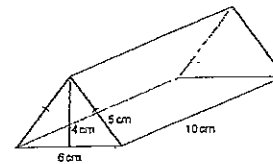
$$AB = ED \text{ (given)}$$

$$BC = EC \text{ (given)}$$

$$\therefore \triangle ABC \cong \triangle DEC \text{ by RHS.}$$

3

10. Find the surface area of the triangular prism.



$$SA = 2 \times \frac{1}{2} \times 4 \times 6 \text{ (base triangles)}$$

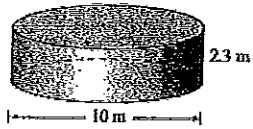
$$+ 2 \times 5 \times 10 \text{ (} 5 \times 10 \text{ rectangles)}$$

$$+ 6 \times 10 \text{ (} 6 \times 10 \text{ rectangle).}$$

$$= 184 \text{ cm}^2$$

2

11. A circular swimming pool has a diameter of 10 m and a depth of 2.3m.



A. Calculate the volume of the pool to the nearest m^3

$$\begin{aligned}
 V &= \pi r^2 h & r &= 5\text{ m} \\
 &= \pi \times 5^2 \times 2.3 \\
 &= 1806\text{ m}^3
 \end{aligned}$$

B. Calculate the number of litres of water required to fill the pool. ($1\text{ m}^3 = 1000\text{ L}$)

$$1806000$$

Student: _____

Teacher: _____

SECTION 3: FINANCIAL MATHEMATICS

MULTIPLE CHOICE: CIRCLE THE CORRECT ANSWER

20 MARKS

1. Sasha works in a computer shop. She is paid \$170 per week plus 12% of the amount of her sales. Calculate her pay in a week when she sells \$2 600 worth of goods.

$$170 + 0.12 \times 2600$$

- A. \$184.50 B. \$190.40 C. \$312 **D. \$482**

2. Angelo earns a gross salary of \$3978 per month. What will be his employer's monthly superannuation contribution, at a rate of 9.25 p.a. %?

- A. \$367.97** B. \$397.80 C. \$4345.97 D. \$4375.80

3. The marked price of a DVD player is \$450. Danny buys the DVD player at a sale for \$396. Calculate the percentage discount.

- A. 12%** B. 14% C. 54% D. 88%

4. Which of the following is the highest annual salary?

- (115648 pa) (115440 pa) (115344 pa)
- A. \$2224 per week B. \$4440 per fortnight C. \$9612 per month **D. \$11 753 p.a.**

5. Equipment with an original value of \$192 000 is depreciated at 11% p.a. of the current value for seven years. The value of the equipment after that time period is closest to:

- A. \$44 160.00 **B. \$84 924.16** C. \$86 419.88 D. \$91 833.00

SHORT/EXTENDED ANSWER: SHOW WORKING

6. Sandy invest \$1500 for 2 years at 5% simple interest per annum. Find the interest from this investment.

$$\begin{aligned} I &= PRT \\ &= 1500 \times 0.05 \times 2 \\ &= \$150 \end{aligned}$$

1

7. \$20 100 is invested at a rate of 6.9% compound interest, compounded annually. Find the value of the investment after 2 years, correct to two decimal places.

$$\begin{aligned} A &= 20100 (1.069)^2 \\ &= \$22969.50 \end{aligned}$$

1

8. Mathew invests \$25 000 into a 2-year fixed term deposit that pays 8% p.a with interest compounded quarterly. Find the interest on this investment after 2 years, correct to the nearest whole number.

$$\begin{aligned} A &= 25000 (1.02)^8 \\ &= \$29291 \\ I &= 29291 - 25000 \\ &= \$4291 \end{aligned}$$

2

9. Josh is on a yearly salary of \$67 234. If he works a 38-hour week, what is his hourly rate to the nearest dollar?

$$\begin{aligned} \text{Hourly Rate} &= \frac{67234}{1976} \\ &= \$34 \end{aligned}$$

1

10. The interest paid on a loan of \$35 000 with a flat interest rate of 6% pa interest was \$12 600. How long was the term of the loan?

$$\begin{aligned} I &= PR T \\ T &= \frac{I}{PR} \\ &= \frac{12600}{35000 \times 0.06} \\ &= 6 \text{ years.} \end{aligned}$$

2

11. Dora works for \$9.60 per hour for eight hours each day on Monday to Friday. She then works six hours over time on Saturday at time and a half. How much does Dora earn for the week's work?

$$\begin{aligned} \text{Mon to Fri: } & 9.60 \times 8 \times 5 = \$384 \\ \text{Sat: } & 9.60 \times 1.5 \times 6 = \$86.4 \\ & + \\ \text{Total: } & \$470.40 \end{aligned}$$

2

12. Liv bought a laptop exactly 2 years ago for \$1780. It depreciates at 16% pa. How much did the laptop depreciate by?

$$\begin{aligned} \text{Price is now: } & 1780 (0.84)^2 = 1255.97 \\ \text{Laptop depreciated by } & 1780 - 1255.97 \\ & = \$524.03 \end{aligned}$$

2

13. Heather sells cars. She earns \$270 per week plus 5% commission on her total weekly sales. What does Heather earn in a week where her sales amount to \$8600?

$$270 + 8600 \times 0.05 = \$700$$

1

14. Luke could invest \$1000 at a simple rate of 11% p.a. for 4 years or 10% p.a. compounded monthly for the same period of time. Which is the better investment and by how much?

$$\begin{aligned} \text{Simple: } I &= PRT \\ &= 1000 \times 0.11 \times 4 = 440 \Rightarrow \text{Final amount is } \$1440. \end{aligned}$$

$$\begin{aligned} \text{Compound: } A &= 1000 \left(1 + \frac{0.10}{12}\right)^{4 \times 12} \\ &= 1489.35 \end{aligned}$$

\therefore Compound is better by \$49.35.

3