PERTH MODERN SCHOOL

Mini Test Chap 10,12,13 & 14

Semester Two 2018
Mathematics Methods
Calc Assumed
(Formula sheet allowed)

Name:

Time: 30 minutes **Total:** /33 marks

Working needs to be shown for full marks

Question 1 [1 marks]

In how many ways can a hand of five cards be dealt from a deck of 54 cards?

Question 2 [2 marks]

A five-letter 'word' is to be made by arranging the letters of the word WHOLEGRAIN. What is the probability that the word begins with a vowel?

Question 3 [4 marks]

A two-digit number is to be formed from the set of numbers {1, 2, 3, 4, 5, 6}. No repetition is allowed. Find the probability that the number:

a is even

b is less than 30

c is even given that it is less than 30.

Question 4 [1 marks]

The period of the graph of $y = 3\sin(\frac{1}{2}x - \pi) + 4$ is

Question 5 [3 marks]

A graph of the function with equation $y = \cos x$ is transformed by a dilation of factor 2 from the y-axis, and a translation of $\frac{\pi}{3}$ units in the negative direction of the x-axis and 1 unit in the negative direction of the y-axis. What is the new equation?

Question 6 [2 marks]

For the equation $\cos(2x) = 1$, the sum of the solutions in the interval $[0, 2\pi]$

Question 7 [2 marks]

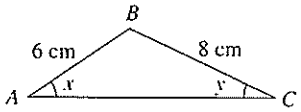
If $\sin\alpha = 0.8$ and $\cos\alpha = 0.6$, what is the value of $\sin(\frac{\pi}{2} + \alpha)$.

Question 8 [1 mark]

The vertical distance above the ground of a point on a wheel as it rotates is given by $D(t) = 2 - 2\sin(3\pi t)$, where t is the time in seconds. What is the time in seconds for a full rotation of the wheel.

Question 9 [2 marks]

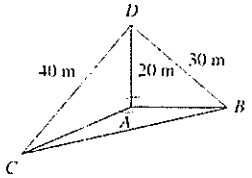
In triangle ABC as shown, $\sin x = \frac{3}{7}$.



What is the value of $\sin y$.

Question 10 [4 marks]

A vertical mast, AD, of height 20 m is supported by two cables attached to the ground at C and B as shown in the diagram. $\angle CAB$ is a right angle. Cable CD is of length 40 m and cable BD is of length 30 m.



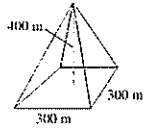
What is the angle ABC, to the nearest degree?

Question 11 [3 marks]

From a point on a cliff 400 m above sea level, the angle of depression to a boat is 30°. Find the distance from the foot of the cliff to the boat.

Question 12 [3 marks]

The diagram shown is a right square-pyramid of height 400 m with its base a square of side 300 m.



If θ is the angle between a sloping face and the base, form an equation which will give the correct value of θ.

Question 13 [4 marks]

A highly volatile substance has an initial mass of 1200 g and its mass is reduced by 12% each second.

a Write a formula that gives the mass of the substance (m) at time (t) seconds.

b What mass remains after 10 seconds, correct to 2 decimal places?

c Calculate how long (to the nearest second) it takes until the mass is 10 grams.

d After how many seconds (to the nearest second) is the mass less than 1 gram?

Question 14 [1 marks]

The equation of the graph shown could be

A $y = 2^{-x} + 1$

B $y = 2^{-2x}$

C $y = 2^{-x+2}$

D $y = 2 \times 2^{-x+2}$

E $y = 2 \times 2^{-x}$