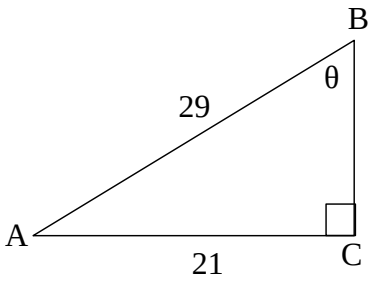
MCT 4C
Mr. Kempe

Name: _____
Date: _____

Test #3 – Trigonometry

[40 marks]

Part A: Multiple Choice [K/U, 10 marks]



1. Which of the following is correct for angle θ, shown right?
   a. $\sin\theta=\frac{21}{29}$ b. $\cos\theta=\frac{21}{29}$
   c. $\tan\theta=\frac{21}{29}$ d. None of the above

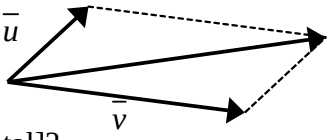
2. An angle in standard position passes through the point (-3,4). Which of the following is true?
   a. $\tan\theta=-\frac{4}{3}$ b. $\tan\theta=-\frac{3}{4}$ c. $\sin\theta=-\frac{4}{3}$ d. $\sin\theta=-\frac{3}{4}$

3. If cos θ is positive, what quadrants could θ be in?
   a. 1 and 2 b. 1 and 3 c. 1 and 4 d. 1 and 5

4. In triangle ABC, sides a = 10, b = 15 and angle A = 30°. How many triangles are possible?
   a. 0 b. 1 c. 2 d. 3

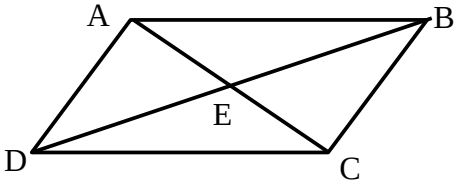
5. Which of the following azimuth bearings is equivalent to a quadrant bearing of [S10°W]?
   a. [170°] b. [190°] c. [260°] d. [280°]

6. What is the resultant vector shown?
   a. $\vec{u}+\vec{v}$ b. $\vec{u}-\vec{v}$ c. $\vec{v}-\vec{u}$ d. $-(\vec{u}+\vec{v})$

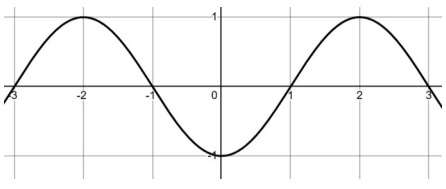


7. What is the horizontal component of 20m [30° above the horizontal]?
   a. 0.2m b. 9.9m c. 10.0m d. 17.3m

8. Given the diagram, which vector is **opposite** to $\overline{AC}$?
   a. $\overline{DB}$ b. $\overline{BD}$ c. $\overline{EA}$ d. $\overline{CA}$



9. Which of the following equations models the function shown?
   a. $y=\sin(90(x-1))$ b. $y=\cos(90(x-2))$
   c. $y=-\cos(90x)$ d. All of the above

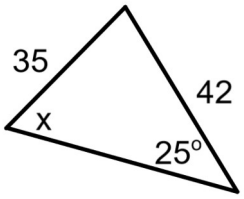


10. Which of the following is **not** true of the function $y=10\cos(60(x-20))+12$?
    a. Amplitude is 10 b. Period is 60 c. Phase shift is 20 right d. Center Line is 12

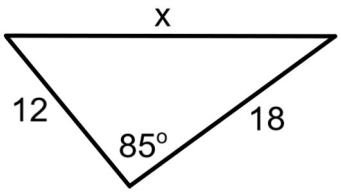
MCT 4C Name: _____
Mr. Kempe Date: _____

Part B: Definition / Short Answer [C, 10 marks]

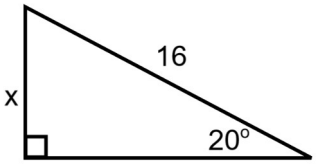
1. For each of the following triangles, state what rule / theorem you should use to directly solve for *x*. [2 marks]



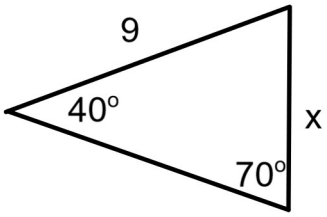
a. _____



b. _____



c. _____



d. _____

2. Define parallel, equivalent, and opposite vectors. [3 marks]

3. Draw an example of an **azimuth** (true) bearing. [1 mark]

4. Describe the role of *a*, *b*, *d*, and *c* in the function $y = a\sin\left[b\left(x-d\right)\right]+c$. [4 marks]

MCT 4C Name: _____
Mr. Kempe Date: _____

Part C: Problem Solving [ATIPS, 20 marks]

Complete any 5 of the following 6 questions. If you complete all 6, you will receive marks for your "best 5".

1. In triangle ABC, $a = 45$, $b = 52$, and $A = 37°$. Determine all possible values for the remaining sides and angles in the triangle.

MCT 4C
Mr. Kempe

Name: _____
Date: _____

2. Two ships depart the harbour in Meaford.
   The first, *Sand Witch*, travels 10km [000°].
   The second, *Seas the Day*, travels 8km [035°].

   How far apart are the boats now?

MCT 4C Name: _____
Mr. Kempe Date: _____

3. A rocket is propelled at an initial velocity of 140m/s at 78° from the horizontal.

   a. Determine the horizontal and vertical components of the velocity.

   b. Determine the height of the rocket 20s after lift-off.

MCT 4C
Mr. Kempe

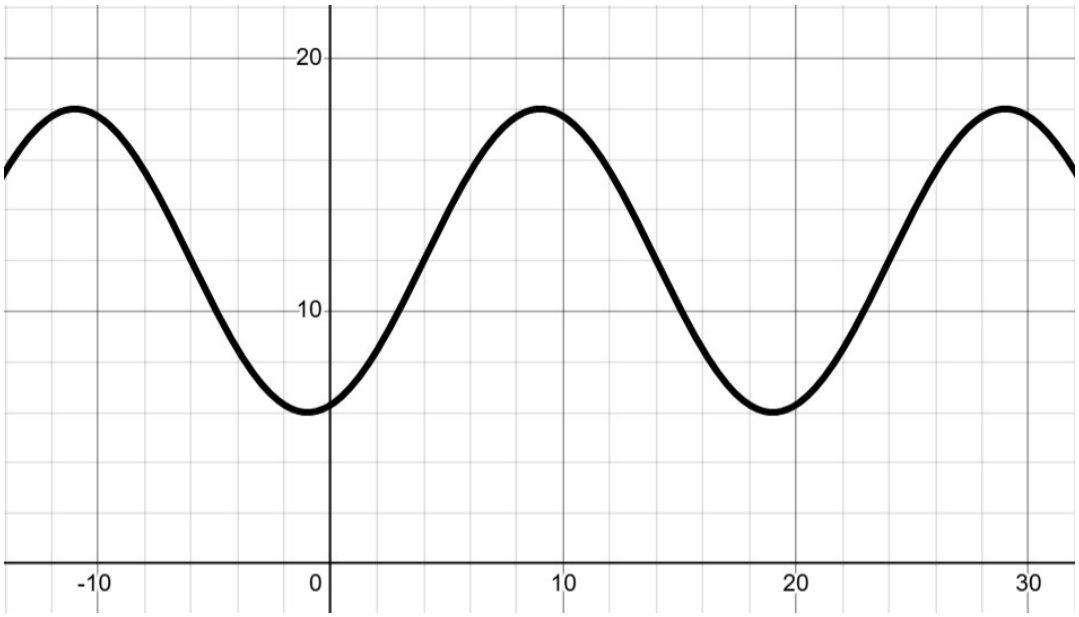
Name: _____
Date: _____

4. An airplane has set a heading of [N30°E] and an airspeed of 500km/h. There is a 30km/h wind blowing from N80°W.
   Determine the resultant velocity of the airplane (both speed and direction).

MCT 4C
Mr. Kempe

Name: _____
Date: _____

5. Consider the following sinusoidal function.



a. Determine the key features (amplitude, period, phase shift, center line) of the function.

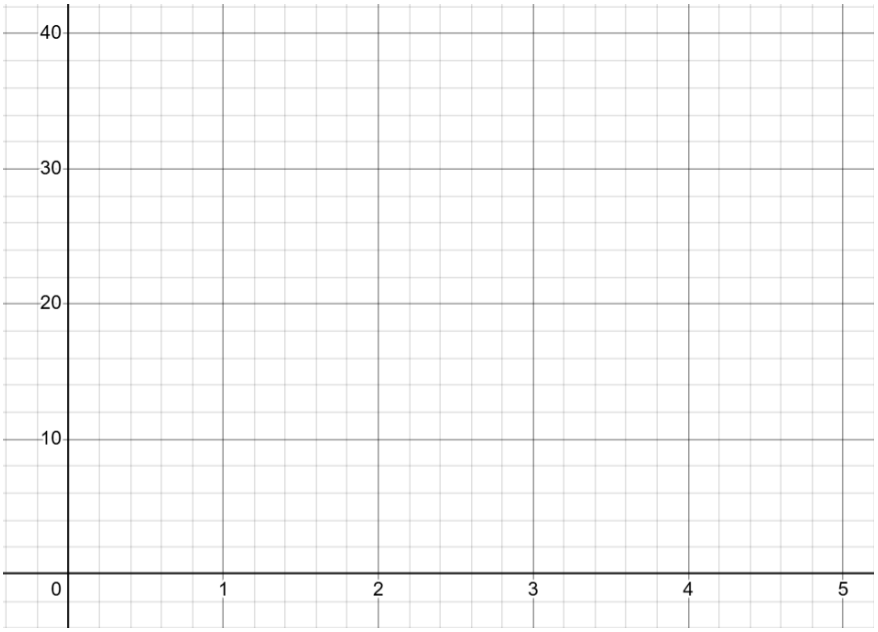
b. Write two possible models for this function.

MCT 4C
Mr. Kempe

Name: _____
Date: _____

6. The height (off the floor) of a baby in a Jolly Jumper™ over time is given by the function $h=-15\cos[300(t)]+15$, where h is the height in centimetres, and t is the time in seconds.

a. Sketch at least two cycles the function on the grid provided.



b. What is the maximum height of the of the baby off the floor?

c. A kitten, measuring 15cm in height, wants to run under the baby. How long does the kitten have to run past without getting stepped on?

MCT 4C
Mr. Kempe

Name: _____
Date: _____

Formula Sheet

Pythagorean Theorem: $a^2+b^2=c^2$

Trigonometric Ratios: $\sin\theta=\frac{\text{opp}}{\text{hyp}}$ $\cos\theta=\frac{\text{adj}}{\text{hyp}}$ $\tan\theta=\frac{\text{opp}}{\text{adj}}$

Sine Law: $\frac{a}{\sin A}=\frac{b}{\sin b}=\frac{c}{\sin C}$ or $\frac{\sin A}{a}=\frac{\sin B}{b}=\frac{\sin C}{c}$

Ambiguous Case: $h=b\sin A$ 180 – θ

Cosine Law: $c^2=a^2+b^2-2ab\cos C$ or $\cos C=\frac{a^2+b^2-c^2}{2ab}$

Vectors: $v_v=|v|\sin\theta$ $v_v=|v|\cos\theta$

Functions: $y=a\sin[b(x-d)]+c$ or $y=a\cos[b(x-d)]+c$