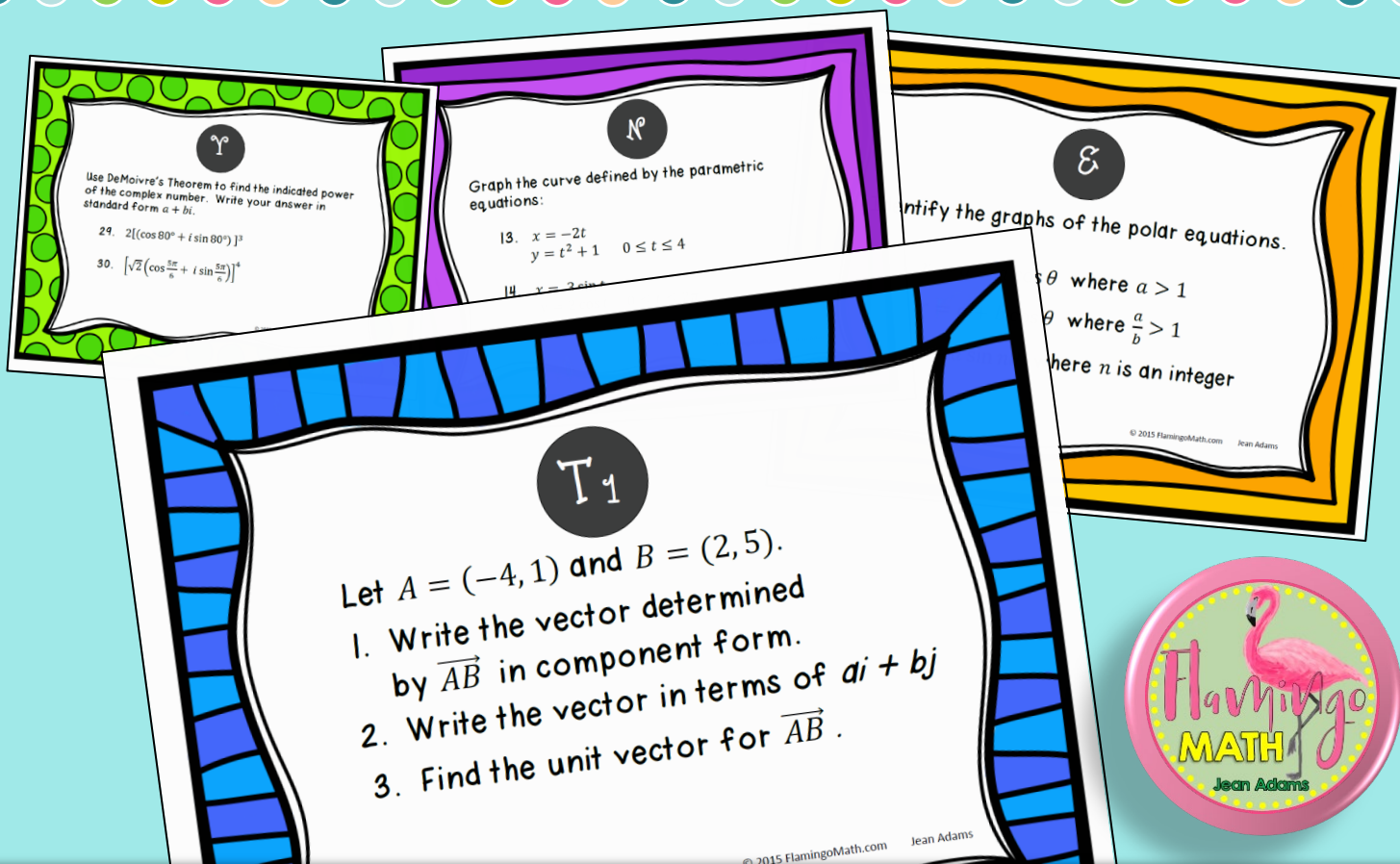


Applications of Trigonometry



T

Use DeMoivre's Theorem to find the indicated power of the complex number. Write your answer in standard form $a + bi$.

29. $2[(\cos 80^\circ + i \sin 80^\circ)]^3$

30. $[\sqrt{2}(\cos \frac{\pi}{6} + i \sin \frac{\pi}{6})]^4$

N

Graph the curve defined by the parametric equations:

13. $x = -2t$
 $y = t^2 + 1 \quad 0 \leq t \leq 4$

14. $x = 2 \cos t$
 $y = 3 \sin t \quad 0 \leq t \leq 2\pi$

E

Identify the graphs of the polar equations.

$r = a \cos \theta$ where $a > 1$

$r = b \sin \theta$ where $\frac{a}{b} > 1$

$r^n = a$ where n is an integer

T₁

Let $A = (-4, 1)$ and $B = (2, 5)$.

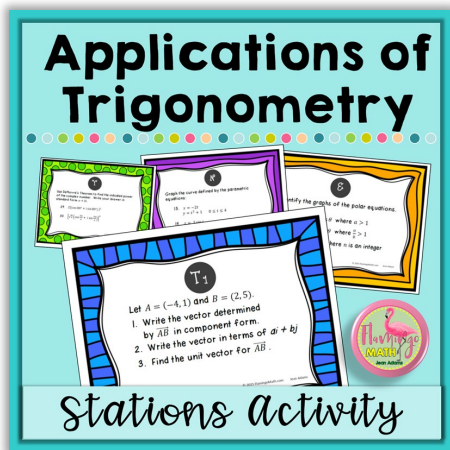
- Write the vector determined by $\overrightarrow{AB}$ in component form.
- Write the vector in terms of $ai + bj$
- Find the unit vector for $\overrightarrow{AB}$.

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Stations Activity

Applications of Trigonometry Stations Activity



KEY CONCEPTS/TOPICS:

1. Polar coordinates and graphs
2. The Complex Plane and DeMoivre's Theorem
3. Vectors and vector applications.
4. Dot Products of Vectors

GENERAL DIRECTIONS:

Students review polar graphs and applications of trigonometry in a station-rotation activity as an end-unit review.

Product Overview

Applications of Trigonometry Stations Activity

This activity is designed to help your **Precalculus and Trigonometry** students understand the concepts for the unit on **Applications of Trigonometry**. There are 12 station task cards in the activity (there are two sizes of task cards.)

Print each task card and laminate for durability or place each question in a clear sheet protector. Place one card at each station and have students move in groups of 3-4 from station to station. Allow about 5 minutes at each station. If time permits, you can provide a wild-card round to allow students to return to any question they didn't complete.

Or, you can reduce the size of the cards, print four to a sheet, give student pairs a set of question to work through the prompts.

There are many other ways the activity can be used. All answer keys are provided.

Print and Go differentiation saves you valuable planning time.

**Please visit my store for more
engaging task card activities.**

T₁

Let $A = (-4, 1)$ and $B = (2, 5)$

1. Write the vector determined by $\overrightarrow{AB}$ in component form.
2. Write the vector in terms of $\mathbf{i}$ and $\mathbf{j}$.
3. Find the unit vector for $\overrightarrow{AB}$.

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R₁

Let $u = \langle 3, -5 \rangle$ and $v = \langle 4, 6 \rangle$

4. Find the dot product of $u \cdot v$.
5. Find component form of $2u + v$.
6. Find the magnitude of $\|2u\|$.

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I

7. What is the vector projection of $u = \langle 6, -3 \rangle$ onto $v = \langle 2, -2 \rangle$?

Note: $\text{proj}_v u = \left(\frac{u \cdot v}{\|v\|^2} \right) v$.

8. Find the component form of the vector v with direction 242° and magnitude 5.

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G

An airplane is flying at 520 mph crosses the sea stream, which is blowing at 160 mi/hr. The angle between the two velocity vectors is 38° . The actual velocity with respect to the ground is the vector sum of these two velocities.

9. Find the actual ground speed of the plane.
10. What angle does the plane's ground velocity vector make with its 520 mph air velocity vector?

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Q₁

11. How much work is done to lift a 58-pound child 5 feet off the ground?
12. An 18,500 lb. truck is parked on a hill with slant of 14° from the horizontal. A tow truck has to remove the truck from its parking spot and move it 120 feet up the hill. How much work is required?

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N

Graph the curve defined by the parametric equations:

$$13. \begin{cases} x = -2t \\ y = t^2 + 1 \end{cases} \quad 0 \leq t \leq 4$$

$$14. \begin{cases} x = 3 \sin t \\ y = 2 \cos t \end{cases} \quad 0 \leq t \leq 2\pi$$

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Q₂

Plot the points in a polar system

15. $A = (3, -\frac{2\pi}{3})$
16. $B = (-2, \frac{\pi}{4})$
17. $C = (-3, -\frac{5\pi}{6})$

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M

18. Convert $(4, \frac{\pi}{6})$ to rectangular form.
19. Convert $(-5\sqrt{3}, 5)$ to polar form.
20. Convert $x^2 + y^2 = 12$ to polar form.
21. Convert $r \csc \theta = 4$ to rectangular form.

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E

Identify the graphs of the polar equations.

22. $r = a - a \cos \theta$ where $a > 0$
23. $r = a + b \cos \theta$ where $\frac{a}{b} > 1$
24. $r = a \sin n\theta$ where n is an integer

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T₂

25. Evaluate. Express your answer in standard form. $4(\cos \frac{2\pi}{3} + i \sin \frac{2\pi}{3}) \cdot 3(\cos \frac{\pi}{6} + i \sin \frac{\pi}{6})$

26. Find the quotient $\frac{z_1}{z_2}$ for the complex numbers $z_1 = 2(\cos 257^\circ + i \sin 257^\circ)$ and $z_2 = 8(\cos 43^\circ + i \sin 43^\circ)$

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R₂

27. Write the complex number in polar form $z = 2\sqrt{3} - 2i$
28. Write the complex number in rectangular form $6(\cos 240^\circ + i \sin 240^\circ)$

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P

Use DeMoivre's Theorem to find the indicated power of the complex number. Write your answer in standard form $a + bi$.

$$29. 2[(\cos 80^\circ + i \sin 80^\circ)]^3$$

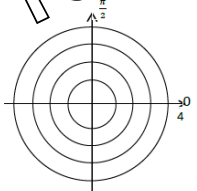
$$30. [\sqrt{2}(\cos \frac{5\pi}{6} + i \sin \frac{5\pi}{6})]^4$$

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APPLICATIONS OF TRIGONOMETRY LAB NAME _____

T_1	1.	2.	3.
	4.	5.	6.
R_1	7.	8.	
I	9.	10.	
G	11.	12.	
Θ_1	13.		

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Θ_2		
	18.	19.
M	20.	21.
ϵ	22.	23.
T_2	25.	26.
R_2	27.	28.
γ	29.	30.

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Jean Adams