Precalculus for Juniors **Name _____**

Assignment 11 – Cumulative Review **Per _____ Date _____**

1. Write the component form of the vector $\overrightarrow{PQ}$ where $P=(-5,-8)$ and $Q=(12,9)$?

2. Write $\overrightarrow{PQ}$ as a linear combination.

3. Find $||\overrightarrow{PQ}||$.

4. Find the direction angle for $\overrightarrow{PQ}$.

Use vectors **u** = $\langle 5,12\rangle$, **v** = $\langle -3,8\rangle$, **w** = $\langle 5,4\rangle$, **f** = $\langle -2,-5\rangle$, **d** = $\langle 4,-7\rangle$ to answer #5-12

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5. **v + w** 6. **(u • v)w** 7. **||u||** 8. 3**f** – 2**d**

9. The unit vector in the same direction as **v**.

10. The direction angle for **f**.

11. **f • d**

12. The angle between **f** and **d**.

Use Points A =(7, 2, 15), B = (3, -7, -11), C = (-8, 2, 4), D = (-5, -5, -5) to answer #13-21

Determine the length of each segment. ***Determine the midpoint of each segment.***

13. $\overline{AB}$ 14. $\overline{BD}$ 15. $\overline{CD}$ 16. $\overline{AC}$

Find the component form of each vector.

17. $\overrightarrow{BA}$ 18. $\overrightarrow{BC}$ 19. $\overrightarrow{DA}$

20. Determine the angle between the vectors: $\overrightarrow{BA}$ and $\overrightarrow{BC}$

21. Find a vector that is orthogonal to both $\overrightarrow{BA}$ and $\overrightarrow{BC}$.

APPLICATIONS

22. Find the component form of the vector for a missile launched at $62°$ with a velocity of 578 mph.

23. A jet is flying on a bearing of N $35°$ E at 410 mph. A cross wind of 75 mph is blowing on a bearing of N $80°$ W. What is the actual speed of the plane?

24. What is the actual bearing of the jet?

25. A boat is pointed straight across a river that flows at a rate of 8 mph. If the engine pushes the boat at 17 mph, how fast does the boat actually travel?

26. Two tugboats pull on a disabled ship. The first pulls at N15^{o}E with a force of 3000 pounds. The second pulls with a force of 3500 pounds at N80^{o}E. What is the resulting combined force exerted on the ship?

27. What is the bearing of the path of the disabled ship?

28. Find the work done when pulling a wagon at a 5^{o} angle with the horizontal with a force of 70 pounds with an for a distance of 100 feet.

29. Find the work done when exerting a force of 700 pounds by a tow truck pulling a car at an angle of 40^{o} for 1000 feet.