

# PHYSICS 1570

## Homework #2

(Due Feb. 6, 2023, 6:00 pm)

**Always show your work. Do NOT just write down the answers.**

**1.** Express the following numbers in scientific notation with one digit to the left of the decimal.

- (a) 5280
- (b) 0.0105
- (c) 10,000
- (d) 0.00001
- (e) 8,500,000
- (f) 0.00000092

**2.** Express the following angles in radians (in terms of  $\pi$ ).

- (a)  $90^\circ$
- (b)  $15^\circ$
- (c)  $120^\circ$
- (d)  $270^\circ$
- (e)  $300^\circ$
- (f)  $540^\circ$

**3.** In a right triangle with hypotenuse 9.00 m and one of the (non-right) angles equal to  $50^\circ$ , then what are the lengths of the two legs?

4. Given a vector with a magnitude of 10 N at an angle of  $45^\circ$ , express the vector in terms of rectangular components with unit vectors.

5. Find the resultant (i.e. the sum) of the following vectors:  $\mathbf{d}_1 = 4.5 \mathbf{i} - 1.2 \mathbf{j}$  m,  $\mathbf{d}_2 = 1.7 \mathbf{i} + 1.9 \mathbf{j}$  m,  $\mathbf{d}_3 = -3.4 \mathbf{i}$  m,  $\mathbf{d}_4 = -1.0 \mathbf{i} - 4.6 \mathbf{j}$  m in (a) cartesian form and (b) in plane polar form.

6. Find:

(a)  $\tan^{-1} \left( \frac{-5}{3} \right)$

(b)  $\tan^{-1} \left( \frac{5}{-3} \right)$

(c)  $\tan^{-1} \left( -\frac{5}{3} \right)$  *Hint: there are two possible answers for this one.*

7. What is  $i^{2023}$  ?

8. Suppose a triangle has sides  $a = 5$ ,  $b = 7$ ,  $c = 9$  (Fig. 5.2 in the course notes). Then what is angle  $C$  opposite side  $c$ ? Give your answer in both degrees and radians.