WRITE ALL YOUR RESPONSES ON THE EXAM SHEETS.

FOR THE MULTIPLE CHOICE, **USE ONLY CAPITAL LETTERS** AND WRITE YOUR REPLY IN THE SPACE PROVIDED. **DO NOT SIMPLY CIRCLE** THE LETTER OF YOUR CHOICE.

FOR THE ITEMS INDICATED AS SHORT ANSWER, WRITE YOUR RESULT IN THE BLANK SPACE.

FOR THE ITEMS INDICAED AS FREE RESPONSE, SHOW ALL YOUR WORK NEATLY. USE AS MANY EXTRA SHEETS AS REQUIRED, AND $\boxed{D\,R\,A\,W \quad A \quad B\,O\,X \quad A\,R\,O\,U\,N\,D}$ YOUR FINAL ANSWER.

YOU MAY USE A CALCULATOR,

0. THE FINAL EXAM FOR THIS CLASS IS 9:00 CLASS: TUESDAY, DEC 10, 2024, 8:00 – 9:50

                        10:30 CLASS: THURSDAY, DEC 12, 2024, 9:30 – 11:20

WHEN IS THE FINAL EXAM FOR THIS CLASS?

              WRITE YOUR ANSWER HERE → _____

I. MULTIPLE CHOICE: WRITE IN THE BLANK SPACE THE LETTER CORRESPONDING TO THE CORRECT RESPONSE. PLEASE USE **ONLY** CAPITAL LETTERS.

1. __E__ WHAT IS THE RESULT OF THE QUADRANT CHECK WHEN SOLVING THE EQUATION

$$\cos(\theta) = \frac{\sqrt{3}}{2} \ ?$$

     A. QI & QIII   B. QI & QII   C. QIII & QIIII   D. QII & QIII   E. NONE OF THESE

2. __A__ WHEN SOLVING THE EQUATION $\sin(\theta) = \frac{1}{2}$ WHAT IS THE RESULT OF THE

QUADRANT CHECK?

     A. QI & QII   B. QI & QIIII   C. QII & QIII   D. QIII & QIIII   E. NONE OF THESE

3. __E__ WHEN SOLVING THE EQUATION $5\tan(\theta) - 10 = 3$ WHAT IS THE RESULT OF THE

QUADRANT CHECK? $5\tan(\theta) = 7 \quad \tan(\theta) = \frac{7}{5}$

     A. QI & QII   B. QI & QIII   C. QII & QIII   D. QIII & QIIII   E. NONE OF THESE

4. __C__ IF THE RESULT OF THE QUADRANT CHECK IS QII & QIII AND $\theta_R = 20°$ WHAT ARE THE

VALUES FOR θ?

     A. $\theta = 120°$ & $\theta = 200°$ B. $\theta = 250°$ & $\theta = 290°$ C. $\theta = 160°$ & $\theta = 200°$

     D. NOT ENOUGH INFORMATION IS GIVEN   E. NONE OF THESE

5. __C__ WHEN SOLVING THE EQUATION $\cos(\theta) = -\frac{\sqrt{3}}{2}$ WHAT IS THE REFERENCE ANGLE?

     A. $\theta_R = 60°$ B. $\theta_R = 45°$ C. $\theta_R = 30°$ D. $\theta_R = -60°$ E. NONE OF THESE

6. __C__ IN WHAT QUADRANT DOES θ LIE IF $\tan(\theta) < 0$ AND $\sec(\theta) < 0$?

     A. QI   B. QII   C. QIII   D. QIIII   E. NONE OF THESE
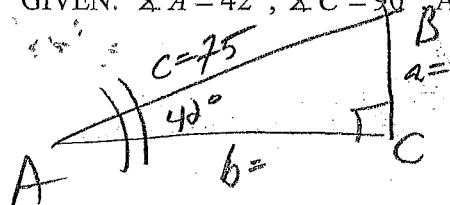
7. __D__ IN WHAT QUADRANT DOES θ LIE IF $\sin(\theta) < 0$ AND $\sec(\theta) > 0$?

     A. QI   B. QII   C. QIII   D. QIIII   E. NONE OF THESE

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II. FREE RESPONSE: FOR EACH OF THE FOLLOWING ITEMS YOU MUST SHOW YOUR WORK NEATLY AND COMPLETELY AS DEMONSTRATED IN CLASS. YOU **DO NOT NEED TO SIMPLIFY** YOUR FINAL RESULTS IN ANY WAY, HOWEVER, ROUND YOUR ANSWERS AS INDICATED, AND $\boxed{D\,R\,A\,W \;\; A \;\; B\,O\,X \;\; A\,R\,O\,U\,N\,D}$ YOUR FINAL ANSWERS. YOUR WORK MUST BE NEAT, READABLE, AND USE ONLY METHODS DISCUSSED IN CLASS.

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8. SOLVE THE TRIANGLE USING THE GIVEN INFORMATION. ROUND ALL VALUES TO ONE DECIMAL PLACE.

GIVEN: $\angle A = 42°$, $\angle C = 90°$, AND SIDE $c = 75$.

$$\boxed{\begin{aligned} \text{Final} \;\; \angle B &= 48°\\ a &= 50.2\\ b &= 55.7 \end{aligned}}$$

$\underline{\angle B:}$ $\angle B = 90 - 42°$
$\quad = 48°$

$\underline{a:}$ $\dfrac{\sin(42°)}{1} = \dfrac{a}{75}$
$\Rightarrow a = (75)(\sin(42°))$
$\quad = 50.184775\cdots$
$\quad \approx 50.2$

$\underline{b:}$ $\dfrac{\cos(42°)}{1} = \dfrac{b}{75}$
$\Rightarrow b = (75)(\cos(42°))$
$\quad = 55.735861\cdots$
$\quad \approx 55.7$

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9. TERRY IS FLYING A KITE WHICH IS DIRECTLY ABOVE CHRIS. TERRY'S ANGLE OF ELEVATION TO THE KITE IS 33.3°. IF DISTANCE BETWEEN TERRY AND CHRIS IS 48 FEET, HOW MUCH STRING IS THERE BETWEEN TERRY AND THE KITE (ASSUME THE STRING IS MAKING A STRAIGHT LINE.) ROUND ALL VALUES TO ONE DECIMAL PLACE.
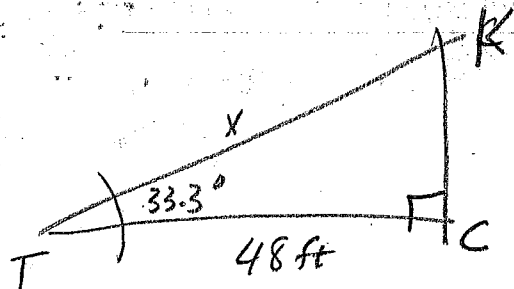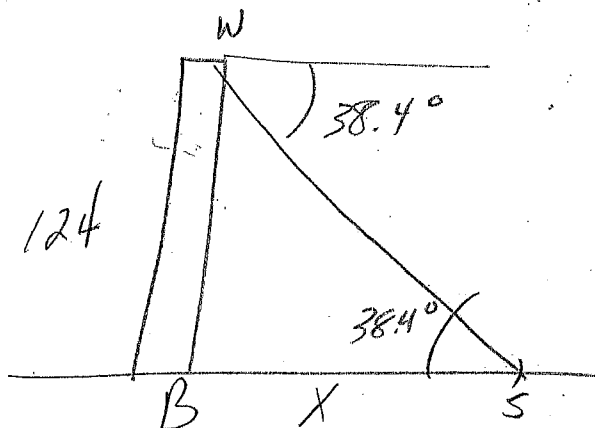
we have:
$$\dfrac{\cos(33.3°)}{1} = \dfrac{48}{x}$$
$$\Rightarrow x \cdot \cos(33.3°) = 48$$
$$\Rightarrow x = \dfrac{48}{\cos(33.3°)}$$
$$= 57.429501\cdots$$
$$\approx \boxed{57.4 \text{ ft}}$$

10. A WORKER AT THE TOP OF A BUILDING HAS AN ANGLE OF DEPRESSION TO A SHED ON THE GROUND OF 38.4°. IF THE BUILDING IS 124 FEET TALL, WHAT IS THE DISTANCE BETWEEN THE SHED AND THE BASE OF THE BUILDING? ROUND ALL VALUES TO ONE DECIMAL PLACE.

we have

$$\tan(38.4°) = \frac{124}{X}$$

$$\Rightarrow X \cdot \tan(38.4°) = 124$$

$$\Rightarrow X = \frac{124}{\tan(38.4°)}$$

$$= 156.449063...$$

$$= 156.4 ft$$

SOLVE EACH EQUATION IN THE INTERVAL $0° \le \theta < 360°$

$\boxed{DRAW \ A \ BOX \ AROUND}$ YOUR FINAL ANSWERS.

EXPRESS YOUR ANSWERS IN **EXACT FORM**.

11. $10\sin(\theta) - 5 = 0$

① Isolate:
$$\Rightarrow 10\sin(\theta) = 5$$
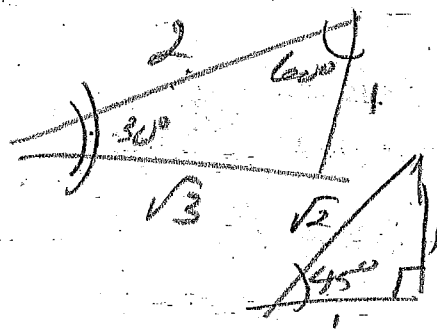$$\Rightarrow \sin(\theta) = \frac{5}{10}$$
$$= \frac{1}{2}$$
$$\overset{SO}{\Rightarrow} \sin(\theta) = \frac{1}{2}$$

② Quad check
$$QI ; QII$$

③ Ref ∡: $\theta_R = 30°$

④ Solve $\boxed{\begin{array}{l} QI \ \ \theta = 30° \\ QII \ \theta = 150° \end{array}}$

CONTINUE SOLVING:

12. $\cos(\theta) = -\dfrac{\sqrt{3}}{2}$

★ Isolate ✓

★ Quad check
   QII; QIII

★ Ref ∠ =
   $\theta_R = 30°$

★ Solve

| QII $\theta = 150°$ |
| QIII $\theta = 210°$ |
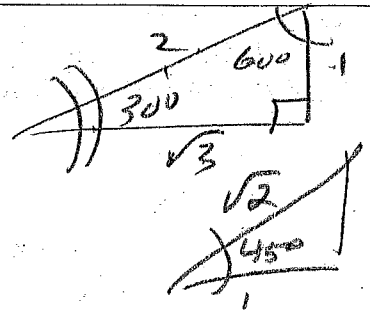
13. $\sec(\theta) = \dfrac{2}{\sqrt{2}}$

★ Isolate ✓

★ Reciprocal
   $\cos(\theta) = \dfrac{\sqrt{2}}{2} = \dfrac{1}{\sqrt{2}}$
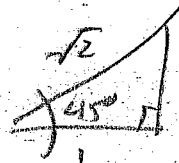
→ $\cos(\theta) = \dfrac{1}{\sqrt{2}}$

★ Quad check:
   QI; QIII

★ Ref ∠:
   $\theta_R = 45°$

★ Solve

| QI: $\theta = 45°$ |
| QIII $\theta = 315°$ |