

Name \_\_\_\_\_  
Date \_\_\_\_\_

MTH 104 Intermediate Algebra  
Class #28 – Review Night #1

### Final Exam Review #1

**Section 1. Evaluating Expressions.**

1. Evaluate:  $f(x) = x^2 - 5x - 6$  for  $f(-5)$

$$f(-5) = (-5)^2 - 5(-5) - 6$$

$$= +25 + 25 - 6$$

$$= 44$$

2. Solve for Roots and Check:

$0 = x^2 + 4x - 21$	$A+x = -7$	$A+x = +3$
$0 = (x+7)(x-3)$	$0 = (-7)^2 + 4(-7) - 21$	$0 = (+3)^2 + 4(+3) - 21$
$0 = x = -7 \quad x = +3$	$0 = +49 - 28 - 21$	$0 = +9 + 12 - 21$
	$0 = 0 \checkmark$	$0 = 0 \checkmark$

3. Evaluate:  $f(x) = x^3 - 8x$  for  $f(-3)$

$$f(-3) = (-3)^3 - 8(-3)$$

$$= -27 + 24$$

$$= -3$$

4. Solve for Roots and Check:

$35 = x^2 + 2x$	$A+x = -7$	$A+x = +5$
$0 = x^2 + 2x - 35$	$35 = (-7)^2 + 2(-7)$	$35 = (5)^2 + 2(5)$
$0 = (x+7)(x-5)$	$35 = +49 - 14$	$35 = 25 + 10$
$x+7=0 \quad x-5=0$	$35 = 35 \checkmark$	$35 = 35 \checkmark$
$-7 \quad -7 \quad +5 \quad +5$		
$x = -7 \quad x = 5$		

5. Evaluate:  $f(x) = x^2 - 5x + 4$  for  $f(4)$

$$f(4) = (4)^2 - 5(4) + 4$$

$$= 16 - 20 + 4$$

$$= 0$$

6. Solve for Roots and Check:

$42 = x^2 - x$	$A+x = -6$	$A+x = +7$
$0 = x^2 - x - 42$	$42 = (-6)^2 - (-6)$	$42 = (7)^2 - (7)$
$0 = (x+6)(x-7)$	$42 = +36 + 6$	$42 = 49 - 7$
$x+6=0 \quad x-7=0$	$42 = 42 \checkmark$	$42 = 42$
$-6 \quad -6 \quad +7 \quad +7$		
$x = -6 \quad x = +7$		

**Section 2. Sum and Difference of Cubes**

1. Factor the Sum of Cubes:  $x^3 + 125 = (a + b)(a^2 - ab + b^2)$

$$a = x \quad = (x + 5)(x^2 - 5x + 25)$$

$$b = 5$$

2. Factor the Difference of Squares.  $25x^2 - 81 = (5x + 9)(5x - 9)$

3. Factor the Trinomial with  $a = 1$ ,  $x^2 + 14x + 48 = (x + 8)(x + 6)$

4. Factor the Difference of Cubes:  $x^3 - 64 = (a - b)(a^2 - ab + b^2)$

$$a = x \quad (a - 4)(a^2 - 4a + 16)$$

$$b = 4$$

5. Factor the Difference of Squares.  $\frac{25}{36}x^2 - \frac{1}{4} = \left(\frac{5}{6}x + \frac{1}{2}\right)\left(\frac{5}{6}x - \frac{1}{2}\right)$

6. Factor the Trinomial with  $a = 1$ ,  $x^2 - 11x - 26 = (x + 2)(x - 13)$

## Section 3. Positive and Rational Exponents

$$\begin{aligned}
 1. \quad \text{Simplify: } (27x^6)^{2/3} &= 27^{2/3} x^{6(2/3)} \\
 &= 9x^4
 \end{aligned}$$

$$\begin{aligned}
 2. \quad \text{Simplify: } \frac{12x^2y^{-5}}{6x^{-3}y} &= \frac{\cancel{12}^2 x^2 x^3}{\cancel{6}_2 y^4 y^3} \\
 &= \frac{2x^5}{y^4}
 \end{aligned}$$

$$\begin{aligned}
 3. \quad \text{Simplify: } 4\sqrt{12} - 3\sqrt{27} \\
 &= 4\sqrt{4}\sqrt{3} - 3\sqrt{9}\sqrt{3} \\
 &= 4 \cdot 2\sqrt{3} - 3 \cdot 3\sqrt{3} \\
 &= 8\sqrt{3} - 9\sqrt{3} \\
 &= -1\sqrt{3} \quad \text{or} \quad -\sqrt{3}
 \end{aligned}$$

$$\begin{aligned}
 4. \quad \text{Simplify: } (16x^{12})^{3/4} \\
 &= 16^{3/4} \cdot x^{12(3/4)} \\
 &= 8x^9
 \end{aligned}$$

$$\begin{aligned}
 5. \quad \text{Simplify: } \left(\frac{2a^3b^{-2}}{c^4}\right)^{-2} &= \frac{2^{-2} a^{-6} b^4}{c^{-8}} \\
 &= \frac{b^4 c^8}{4a^6} \\
 &= \frac{b^4 c^8}{4a^6}
 \end{aligned}$$

$$\begin{aligned}
 6. \quad \text{Simplify: } -3\sqrt{20} - 5\sqrt{125} + \sqrt{5} \\
 &= -3\sqrt{4}\sqrt{5} - 5\sqrt{25}\sqrt{5} + \sqrt{5} \\
 &= -3 \cdot 2\sqrt{5} - 5 \cdot 5\sqrt{5} + \sqrt{5} \\
 &= -6\sqrt{5} - 25\sqrt{5} + \sqrt{5} \\
 &= -30\sqrt{5}
 \end{aligned}$$

Section 4. Literal Equations and Polynomials

1. Solve for  $p$ :  $I = p + prt$  \* NOTE  $p$  in 2 terms

$$\frac{I}{(1+rt)} = \frac{p(1+rt)}{(1+rt)} \rightarrow \frac{I}{(1+rt)} = p$$

2. Multiply:  $(x + 5)(2x^2 - 3x - 5)$  \* FOLLOW THE PATH

$$\begin{array}{r} 2x^2 - 3x - 5 \\ x + 5 \\ \hline 2x^3 - 3x^2 - 5x \\ + 5x^2 - 15x - 25 \\ \hline 2x^3 + 2x^2 - 20x - 25 \end{array}$$

3. Divide Using Long Division: Divide:  $2a^3 + 5a^2 - 9a + 15$  by  $a + 5$

$$\begin{array}{r} 2a^2 - 5a + 16 - \frac{65}{a+5} \\ a+5 \overline{) 2a^3 + 5a^2 - 9a + 15} \\ \underline{2a^3 + 10a^2} \phantom{+ 15} \\ -5a^2 - 9a \phantom{+ 15} \\ \underline{-5a^2 - 25a} \phantom{+ 15} \\ +16a + 15 \\ \underline{+16a + 80} \\ -65 \end{array}$$

4. Divide Using Synthetic Division:  $\frac{x^3 + 3x^2 + 5x + 9}{x + 1}$

$$\begin{array}{r|rrrr} -1 & 1 & +3 & +5 & +9 \\ & & -1 & -2 & -3 \\ \hline & 1 & +2 & +3 & +6 \end{array} = x^2 + 2x + 3 + \frac{6}{x+1}$$

5. Solve for  $r$ :  $rx + ry = t$

$$= r(x+y) = t$$

$$\frac{r(x+y)}{(x+y)} = \frac{t}{(x+y)}$$

$$r = \frac{t}{(x+y)}$$

6. Multiply:  $(2x - 3)(4x^2 + 8x - 5)$

$$\begin{array}{r} 4x^2 + 8x - 5 \\ 2x - 3 \\ \hline 8x^3 + 16x^2 - 10x \\ - 12x^2 - 24x + 15 \\ \hline 8x^3 + 4x^2 - 34x + 15 \end{array}$$

7. Divide Using Long Division  $\frac{8x^2 - 18x - 11}{4x - 1}$

$$\begin{array}{r} 2x - 4 - \frac{13}{4x-1} \\ 4x-1 \overline{) 8x^2 - 18x - 11} \\ \underline{8x^2 - 2x} \phantom{- 11} \\ -16x - 11 \\ \underline{-16x + 2} \\ -13 \end{array}$$

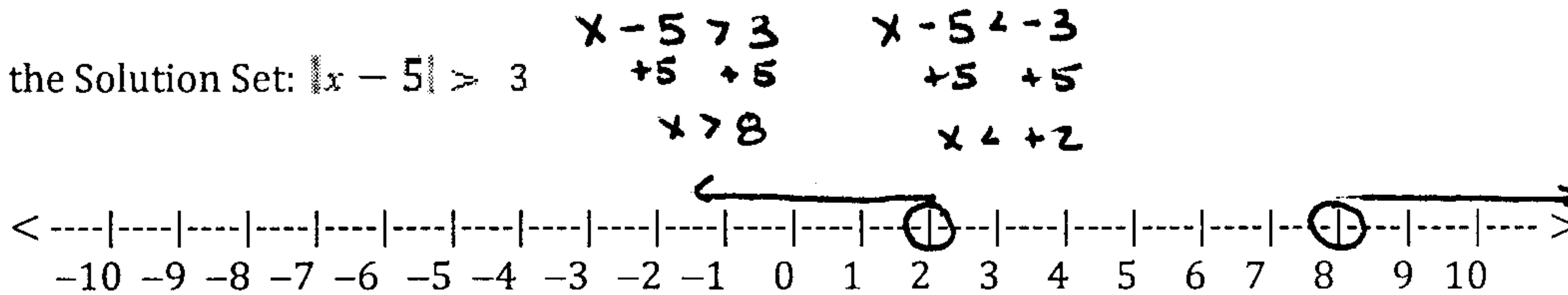
8. Divide Using Synthetic Division:  $\frac{3x^3 + 7x^2 - 4x + 16}{x + 3}$

$$\begin{array}{r|rrrr} -3 & 3 & +7 & -4 & +16 \\ & & -9 & +6 & -6 \\ \hline & 3 & -2 & +2 & +10 \end{array} \quad 3x^2 - 2x + 2 + \frac{10}{x+3}$$

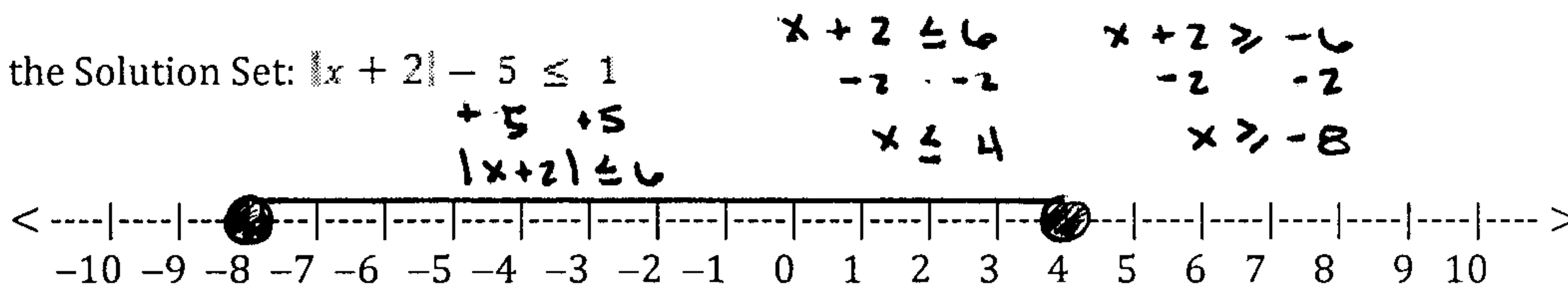
1. Graph the Solution Set:  $-3 < x + 5 \leq 8$



2. Solve and Graph the Solution Set:  $|x - 5| > 3$



3. Solve and Graph the Solution Set:  $|x + 2| - 5 \leq 1$



4. Solve and Check:  $(\sqrt{2x + 3})^2 = (5)^2$

$$\begin{array}{r} 2x + 3 = 25 \\ -3 \quad -3 \\ 2x = 22 \\ x = 11 \end{array}$$

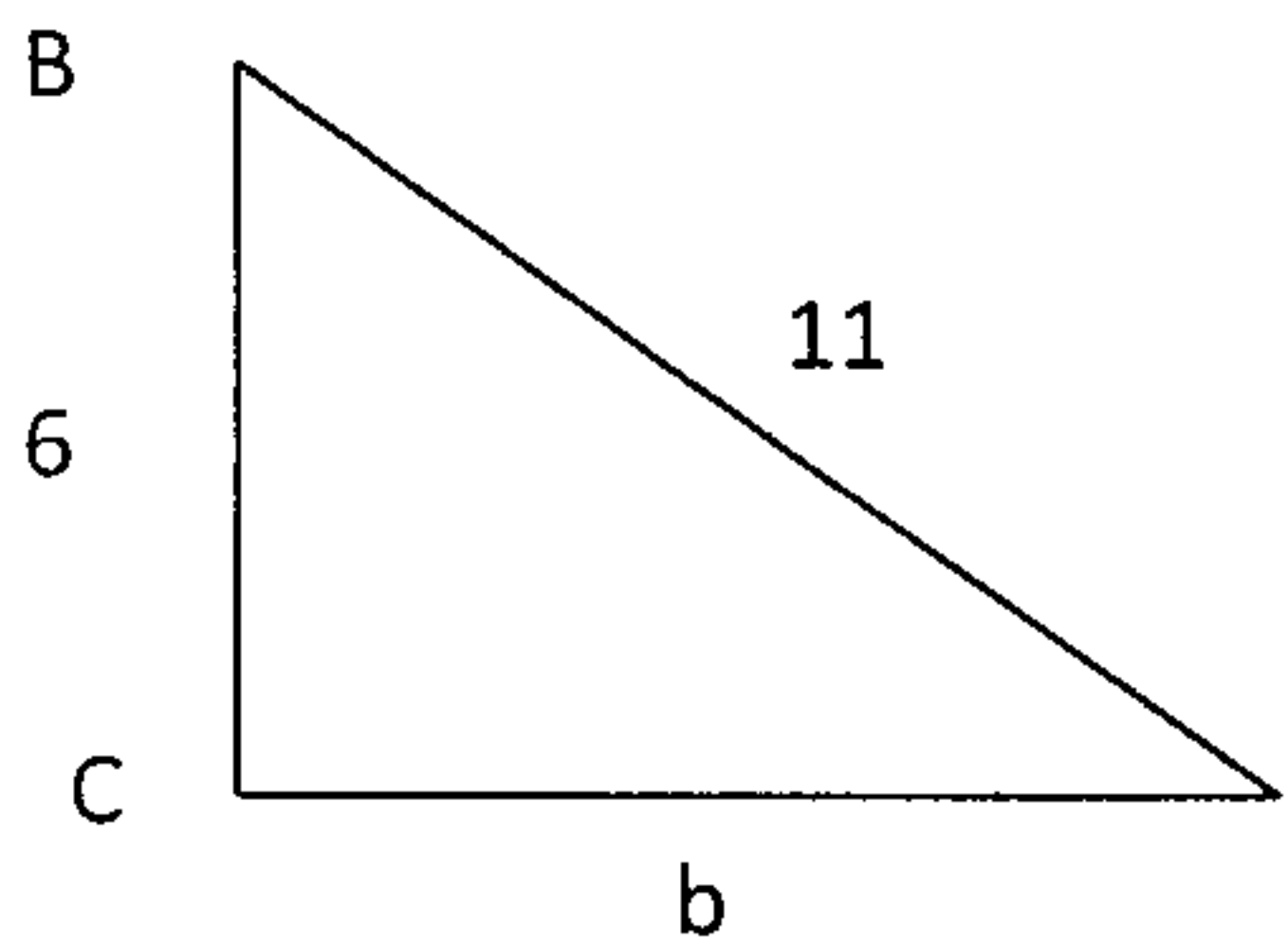
$$\begin{array}{r} \sqrt{2(11) + 3} = 5 \\ \sqrt{22 + 3} = 5 \\ \sqrt{25} = 5 \\ 5 = 5 \end{array}$$

5. Solve and Check:  $\sqrt{y + 5} + 7 = 10$

$$\begin{array}{r} (\sqrt{y + 5})^2 = (3)^2 \\ y + 5 = 9 \\ y = 4 \end{array}$$

$$\begin{array}{r} \sqrt{4 + 5} + 7 = 10 \\ \sqrt{9} + 7 = 10 \\ 3 + 7 = 10 \\ 10 = 10 \checkmark \end{array}$$

6. Given the Right Triangle ABC, Find the EXACT VALUES for:  $\sin A$ ,  $\cos A$ , and  $\tan A$ . Express all answers in simplified radical form:



1. Solve for b

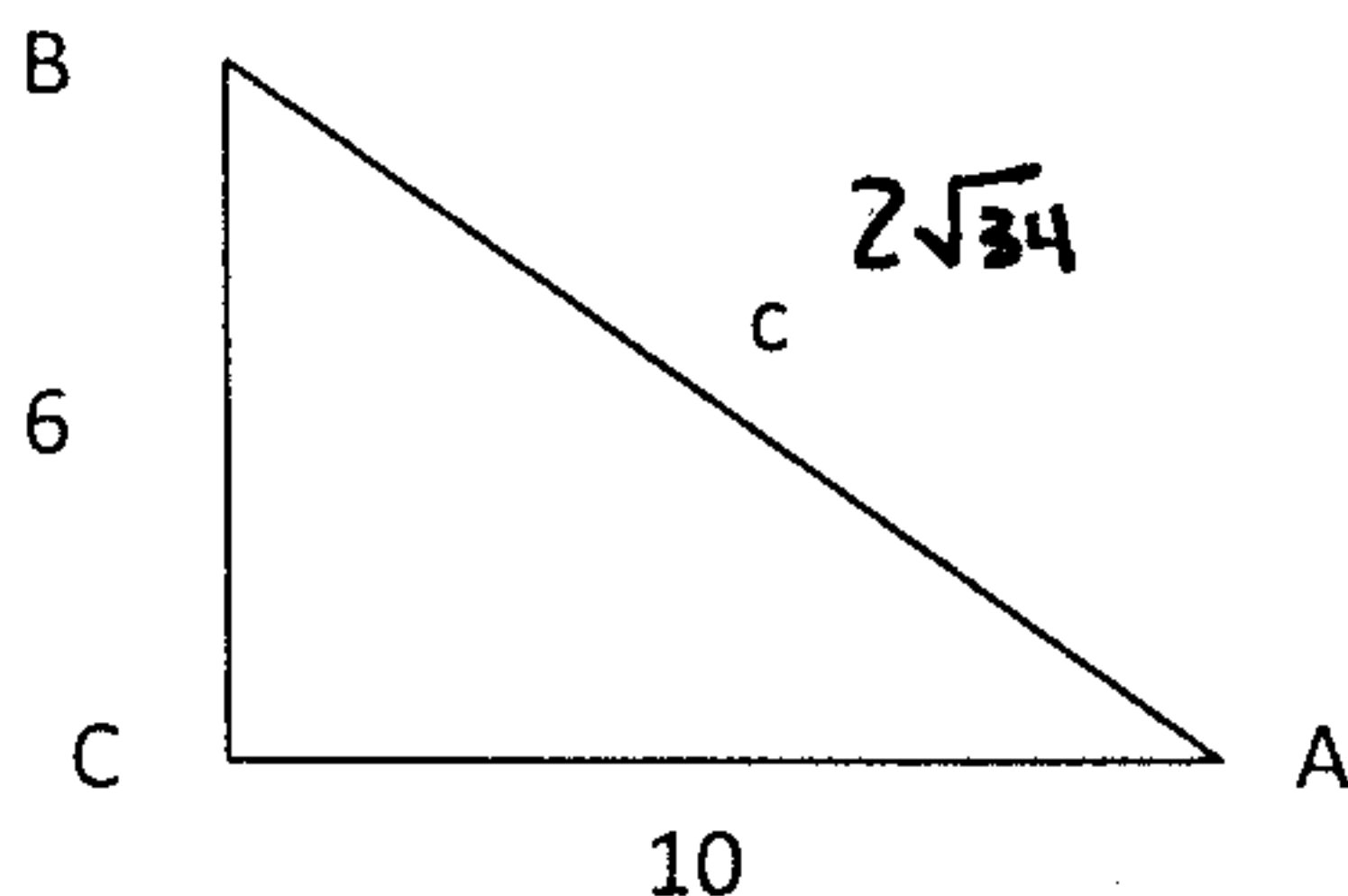
$$\begin{array}{r} a^2 + b^2 = c^2 \\ 6^2 + b^2 = (11)^2 \\ 36 + b^2 = 121 \\ -36 \quad -36 \\ b^2 = 85 \\ b = \sqrt{85} \end{array}$$

1.  $\sin A = \frac{\text{opp}}{\text{hyp}} = \frac{6}{11}$

2.  $\cos A = \frac{\text{adj}}{\text{hyp}} = \frac{\sqrt{85}}{11}$

3.  $\tan A = \frac{\text{opp}}{\text{adj}} = \frac{6}{\sqrt{85}} \cdot \frac{\sqrt{85}}{\sqrt{85}} = \frac{6\sqrt{85}}{85}$

6. Given the Right Triangle ABC, Find the EXACT VALUES for:  $\sin A$ ,  $\cos A$ , and  $\tan A$ . Express all answers in simplified radical form:



1. Solve for c

$$\begin{array}{r} a^2 + b^2 = c^2 \\ 6^2 + 10^2 = c^2 \\ 36 + 100 = c^2 \\ 136 = c^2 \\ \sqrt{136} = c \\ \sqrt{4\sqrt{34}} = c = 2\sqrt{34} \end{array}$$

1.  $\sin A = \frac{6}{2\sqrt{34}}$

$$= \frac{3}{\sqrt{34}} \cdot \frac{\sqrt{34}}{\sqrt{34}} = \frac{3\sqrt{34}}{34}$$

2.  $\cos A = \frac{10}{2\sqrt{34}}$

$$= \frac{5}{\sqrt{34}} \cdot \frac{\sqrt{34}}{\sqrt{34}} = \frac{5\sqrt{34}}{34}$$

3.  $\tan A = \frac{6}{10} = \frac{3}{5}$