

Read all directions carefully.

Watch out for simple, careless errors.

Make sure all figures are labeled appropriately.

Please indicate all answers clearly so they are easy to locate.**Show ALL work you have done to receive full credit for your answer.**

1) (5 pts.) Draw a rectangle using algebra tiles for the expression $2x^2 + 7x + 5$. Sketch your rectangle and write the area as a sum and as a product.

① $2x^2 + 7x + 5$

- area as a sum $\rightarrow x^2 + x^2 + x + x + x + x + x + x + x + x$

& as a product $= (x+1)(2x+5)$

1+1+1+1+1 = $2x^2 + 7x + 5$

2) (3 pts.) **Multiple Choice:** The quadratic expression $6x^2 + 6x - 12$ has several possible sets of factors. Which set of factors below is not a possible answer? Explain how you know.

a. $6(x-1)(x+2)$

b. $(6x-6)(x+2)$

c. $(x-6)(6x+2)$

d. $(3x-3)(2x+4)$

② $6x^2 + 6x - 12$ (not a possible answer)

a. $6(x-1)(x+2)$ $\oplus (x-6)(6x+2)$

b. $(6x-6)(x+2)$ $\ominus (3x-3)(2x+4)$

c. $(x-6)(6x+2)$ \otimes

d. $(3x-3)(2x+4)$ \otimes

Letter (C) is not a possible answer because the expression doesn't equal to the factors. In other words, when $(x-6)(6x+2)$ turns into $6x^2 + 2x - 36x - 12$, then combining like terms, the final expression is $6x^2 - 34x - 12$ not $6x^2 + 6x - 12$.

3) (8 pts) Factor the following quadratics if possible. If a quadratic cannot be factored, explain why not.

a. $2x^2 - 11x + 12$

b. $y^2 + 7y + 7$

③ a. $2x^2 - 11x + 12 \rightarrow -3 \times -8 \rightarrow -4 \times -3$

$\begin{array}{r|rr} 2x^2 & -3x & -8x & +12 \\ -4x & +12 & & \end{array} = (x-4)(2x-3)$

b. $y^2 + 7y + 7 \rightarrow$ Not possible, no 2 digit equal

$7 \cdot 1 = 7$ $2+5=7$ (x10) $6+1=7$ (x6) $7+1=8$ (x1)

$1 \cdot 7 = 7$ $3+4=7$ (x12)

c. $5m^2 - 14m + 8$

d. $15p^2 - 3p$

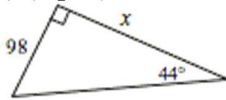
c. $5m^2 - 14m + 8 \rightarrow -4 \times -10 \rightarrow -2 \times -8$

$\begin{array}{r|rr} 5m^2 & -4m & -10m & +8 \\ -2m & +8 & & \end{array} = (m-2)(5m-4)$

d. $15p^2 - 3p \rightarrow 3p \begin{array}{r|r} 5p^2 & -1 \end{array} = 3p(5p-1)$

$3p \cdot 5p = 15p^2$ $3p \cdot -1 = -3p$

4) (5 pts.) Solve for the missing side length. Show your work. Round lengths to the nearest tenth.

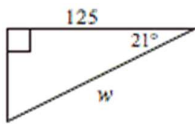


④ $\rightarrow 98/x = \sin(44^\circ)$ $\rightarrow x \cdot \tan(44^\circ) = 98 / \tan(44^\circ)$

$$x = \frac{98}{\tan(44^\circ)}$$

$$x = 101.48 \text{ or } 101.5$$

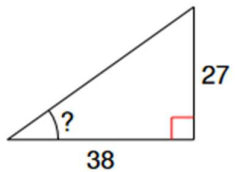
5) (5 pts.) Use trigonometric ratios to solve for the variable. Show your work. Round lengths to the nearest tenth.



* ⑤ $\rightarrow \cos(21^\circ) = \frac{125}{w}$ $\rightarrow w = \frac{125}{\cos(21^\circ)}$

$$w = 312$$

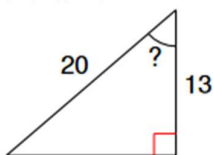
6) (3 pts.) Solve for the missing angle. Show your work.



⑥ $\rightarrow \tan(\theta) = \frac{27}{38} \rightarrow \tan^{-1}\left(\frac{27}{38}\right) = \theta$

$$86^\circ = \theta$$

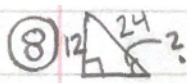
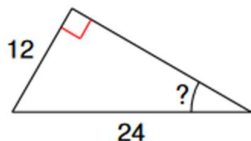
7) (3 pts.) Solve for the missing angle. Show your work.



⑦ $\rightarrow \sin(\theta) = \frac{13}{20} \rightarrow \sin^{-1}\left(\frac{13}{20}\right) = \theta$

$$60^\circ \text{ or } 61^\circ = \theta$$

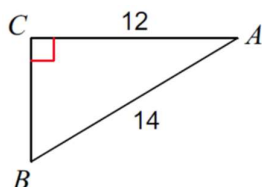
8) (3 pts.) Solve for the missing angle. Show your work.



$$\sin(\theta) = 12/24 \rightarrow \sin^{-1}\left(\frac{12}{24}\right) = \theta$$

$$47^\circ \text{ or } 48^\circ = \theta$$

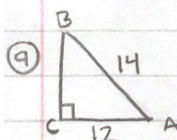
9.) (6 pts.) Solve the triangle for all missing side lengths and angle measures. Show your work to receive full credit.



$\angle A =$ _____

$\angle B =$ _____

$a =$ _____



$\angle A = 66^\circ$

$\angle B = 24^\circ$

$a = \frac{1}{2}(b \cdot h)$
 $c = 42 \text{ in}^2$

$\angle A \rightarrow \cos(\theta) = 12/14 \rightarrow \cos^{-1}\left(\frac{12}{14}\right) = \theta$
 $65^\circ \text{ or } 66^\circ = \theta$

$\angle B \rightarrow 90 + 66 = 156 \rightarrow 180 - 156 = 24$

$a^2 + b^2 = c^2$

$a^2 + 12^2 = 14^2$

$a^2 + 144 = 196$
 $-144 -144$

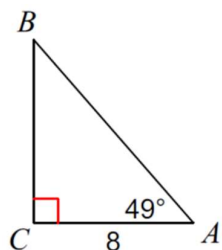
$a^2 = 52$

$a = 7$

$a = \text{area}$

$(7 \cdot 12) = 84 \times \frac{1}{2} =$
 42

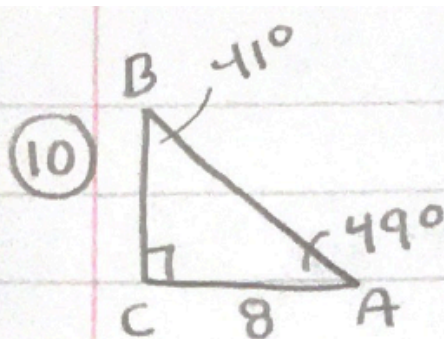
10) (6 pts.) Solve the triangle for all missing side lengths and angle measures. Show your work to receive full credit.



$\angle B =$ _____

$a =$ _____

$c =$ _____



$\angle B = 41^\circ$

$\angle A = 49^\circ$

$\angle C = 90^\circ ?$

$\angle B = 90$
 49
 139

180
 -139
 41

Ch.4 Factoring + Trig Test Version 3

Name: _____

Date: _____ Pd. _____

Bonus) (4 pts) Factor each of the expressions below, if possible. Show your work.

a. $169x^2 - 289$

c. $16x^2 - 8x + 1$

b. $x^2 + 10x + 25$

d. $x^2 - \frac{1}{4}$

(bonus) (a) $169x^2 - 289$
 $\begin{array}{r} 169x^2 + 221x - 221x - 289 \\ \hline 13x(13x+17) - 17(13x+17) \\ \hline = (13x-17)(13x+17) \end{array}$

(b) $x^2 + 10x + 25$
 $\begin{array}{r} 25 \\ \times \\ 5 \quad 5 \\ \hline 10 \end{array}$
 $\begin{array}{r} x^2 \quad 5x \\ \times \\ 5 \quad 5 \\ \hline 5x \quad 25 \\ \hline x^2 \quad 10x \quad 25 \end{array} = (x+5)(x+5) = (x+5)^2$

(c) $16x^2 - 8x + 1$
 $\begin{array}{r} 16 \\ \times \\ -4 \quad -4 \\ \hline -8 \end{array}$
 $\begin{array}{r} 16x^2 \quad -4x \\ \times \\ -1 \quad -1 \\ \hline -4x \quad 1 \\ \hline 16x^2 \quad -8x \quad 1 \end{array} = (4x-1)(4x-1) = (4x-1)^2$

(d) $x^2 - \frac{1}{4} \rightarrow x^2 - 0.25$
 Not possible.