Ch.4 Factoring + Trig Test Version 3

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Date: 12.2.20 Pd. 1

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.

$2x^2 + 7x + 5$

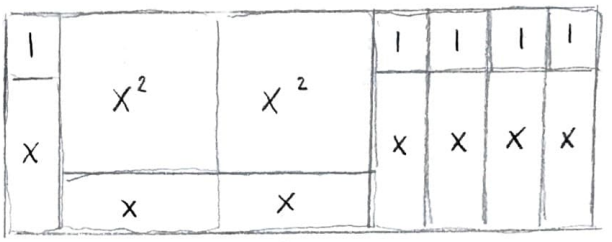
$10x^2$, $5x$, $2x$, $7x$

	$2x$	5
x	$2x^2$	$5x$
1	$2x$	5

$2x^2 + 2x + 5x + 5$

$(2x+5)(x+1)$ = Product

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



← algebra tile

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.

$6x^2+6x-12$

$-72x^2$, $6x$, 12, -6, $6x$

	$6x^2$	$-6x$
$12x$	$12x$	-12

x -1

$(6x+12)(x-1)$

a. $6(x-1)(x+2)$
$6(x^2+2x-x-2)$
$6x^2+12x-6x-12 \rightarrow 6x^2+6x-12$

b. ✓ $(6x-6)(x+2)$
$6x^2+12x-6x-12 \rightarrow 6x^2+6x-12$

c. $(x-6)(6x+2)$
$6x^2+2x-36x-12$
$6x^2-34x-12$
$6x^2+6x-12 \neq 6x^2-34x-12$

d. ✓ $(3x-3)(2x+4)$
$6x^2+12x-6x-12$
$6x^2+6x-12$

* I did the reverse by multiplying using the distributive property to get the standard form to compare to $6x^2+6x-12$. When doing the reverse to everything but c I got $6x^2+6x-12$

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

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

$24x^2$, $-8x$, $-3x$, $-11x$

	$2x$	-3
$1x$	$2x^2$	$-3x$
-4	$-8x$	12

$(2x-3)(x-4)$

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

* Not possible since when attempting to do the diamond you can't find two whole numbers that multiply to $7y^2$ but add to make $7y$.

$7y^2$, $-$, $7y$, $-$

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

$40m^2$, $-10m$, $-4m$, $-14m$

$(5m-4)(m-2)$

	$5m$	-4
$1m$	$5m^2$	$-4m$
-2	$-10m$	$8m$

d. $15p^2 - 3p + 0$

0, 0, -3, $-3p$

	$5p$	-1
$3p$	$15p^2$	$-3p$
0	0	0

$\rightarrow 3p(5p-1)$

$15p^2 - 3p$

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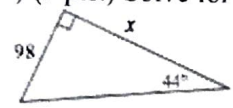
4) (5 pts.) Solve for the missing side length. Show your work. Round lengths to the nearest tenth.



$\tan = \frac{o}{h}$

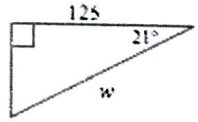
$\tan(44) = \frac{98}{x} \cdot x$

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

$x = 101.48197\ldots$

$x \approx 101.5$

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



$\cos = \frac{a}{h}$

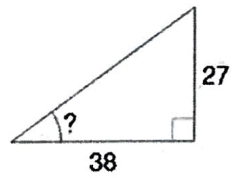
$w \cdot \cos(21) = \frac{125}{w} \cdot w$

$\frac{\cos(21)w}{\cos(21)} = \frac{125}{\cos(21)}$

$w = 133.8931242$

$w \approx 133.9$

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

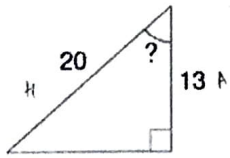


$\tan = \frac{o}{a}$

$\tan^{-1}\left(\frac{27}{38}\right) = 35.39479584\ldots$

$\approx 35.40°$

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



$\cos\left(\frac{a}{h}\right)$

$\cos^{-1}\left(\frac{13}{20}\right) = 49.45839813\ldots$

$\approx 49.46°$

→ Nearest tenth, rounded $\approx 49.5°$

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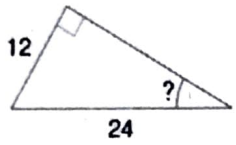
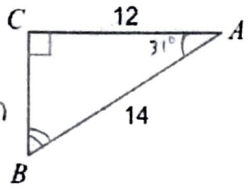
8) (3 pts.) Solve for the missing angle. Show your work.



$\sin = \frac{o}{h}$ $\sin(30) = \frac{o}{24}$

$\sin^{-1}\left(\frac{12}{24}\right) = \boxed{30°}$

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



$\angle A = \approx 31°$

$\angle B = \approx 59°$

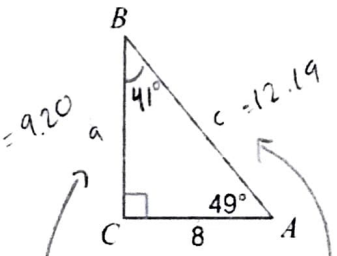
$a = 7.21$

→ $\cos^{-1}\left(\frac{12}{14}\right) = 31.002719\overline{3}° \approx 31°$

→ $\sin^{-1}\left(\frac{12}{14}\right) = 58.99728087 \approx 59°$

→ $\tan(31) = \frac{x}{12} \cdot 12 = 7.21$

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



$\angle B = 41°$

$a = 9.20$

$c = 12.19$

→ $8 \cdot \tan(49) = \frac{a}{8} \cdot 8$

$\boxed{9.20 = a}$

→ $90 - 49 = 41°$

$\boxed{\angle B = 41°}$

→ $\tan^{-1}\left(\frac{8}{9.20}\right) = 41°$

$\tan(41)\ \frac{8}{9.2}$

→ $\frac{c \cdot \cos(49)}{\cos(49)} = \frac{8}{c} \cdot \frac{c}{\cos(49)}$

$\boxed{c = 12.19}$

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$\Rightarrow u^2 - v^2 = (u-v)(u+v)$

$\Rightarrow u^2 + 2uv + v^2 = (u+v)^2$

$\Rightarrow u^2 - 2uv + v^2 = (u-v)^2$

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

$u^2 = 169 \Rightarrow \sqrt{169}$

$v^2 = 289 \Rightarrow \sqrt{289}$

a. $169x^2 - 289$

$u^2 \cdot x^2$

$u = 13$

$v = 17$

$(13x-17)(13x+17)$

$169x^2 - 221x + 221x - 289$

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

$u^2 - 2uv + v^2$

$(u-v)^2$

$u^2 = \sqrt{16}$ $\quad u = 4$

$v^2 = \sqrt{1}$ $\quad v = 1$

$-2(4)(1)$

-8

$(4x-1)^2$

$(4x-1)(4x-1)$

$16x^2 - 4x - 4x + 1$

$16x^2 - 8x + 1$

$u^2 + 2uv + v^2$

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

$u = 1$

$v = 5$

$2(1)(5)$

10

$(x+5)^2$

$(1x+5)(1x+5)$

$(1x^2 + 5x + 5x + 25)$

$x^2 + 10x + 25$

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

$u^2 - v^2$

$u = 1$

$v = 0.5$

$(x-0.5)(x+0.5)$

$x^2 + 0.5x - 0.5x - 0.25$

$x^2 - 0.25$

$\downarrow$

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

$u^2 = \sqrt{1} \Rightarrow u = 1$

$v^2 = \sqrt{0.25} \Rightarrow v = 0.5$