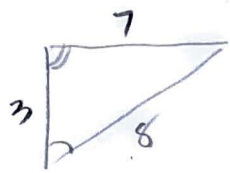
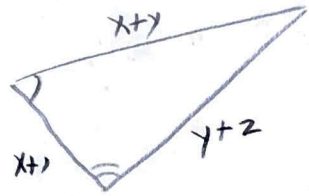
Provocative Proportions

① 



$\frac{3}{x+1} = \frac{8}{x+y}$ $\quad$ $\frac{3}{x+1} = \frac{7}{y+2}$

$8x+8 = 3x+3y$ $\quad$ $3y+6 = 7x+7$

$5x-3y = -8$ $\quad$ $7x-3y = -1$

$-(7x-3y = -1)$

$-2x = -6$

$x = 3 \Rightarrow y = \frac{15+8}{3} = \frac{23}{3}$

② $\frac{4}{c-6} = \frac{c}{c-4}$

$4c-16 = c^2-6c$

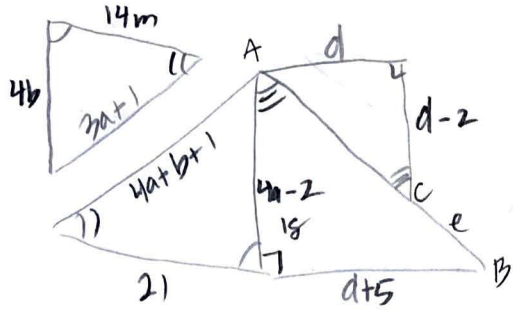
$0 = c^2-10c+16$

$0 = (x-8)(x-2)$

$c = 8$ or 2 ~~*~~ makes lengths ≤ 0

$\therefore c = 8$

3



From non-right Δ's

$$\frac{14}{21} = \frac{2}{3} = \frac{4b}{4a-2}$$

$$8a-4 = 12b$$

$$8a-12b = 4$$

$$2a-3b = 1$$

$$2(2b-1)-3b = 1$$

$$4b-2-3b = 1$$

$$b = 3$$

$$a = 2(3)-1 = 5$$

$$\frac{2}{3} = \frac{3a+1}{4a+b+1}$$

$$8a+2b+2 = 9a+3$$

$$-a+2b = 1$$

$$a = 2b-1$$

From right Δ's

$$\frac{18}{d-2} = \frac{d+5}{d}$$

$$18d = d^2+3d-10$$

$$0 = d^2-15d-10$$

$$d = \frac{-(-15) \pm \sqrt{225-4(1)(-10)}}{2} = \frac{15 \pm \sqrt{265}}{2}$$

$$d = 15.639, -.639$$ ~~A~~

Now, $AB = \sqrt{18^2+20.639^2}$

$= 27.3859$

$AC = \sqrt{15.639^2+13.639^2}$

$= 20.7515$

$\therefore e = AB-AC$

$= 6.63$