## Inequalities in One Triangle Total points = 107

1.  $\overline{BC} < \overline{AC} < \overline{AB} \checkmark$ ∴ ∠A < ∠B < ∠C **√** 2.  $\overline{DF} < \overline{EF} < \overline{DE} \checkmark$ ∴ ∠*E* < ∠*D* < ∠*F* ✓ В 1.  $m \angle A + m \angle B + m \angle C = 180^{\circ}$  $129^{\circ} + m \angle C = 180^{\circ} \checkmark$  $m\angle C = \underline{180^{\circ}} - 129^{\circ} \checkmark$  $m \angle C = \boxed{51^{\circ}} \checkmark$  $\angle A < \angle \overline{C} < \angle B \checkmark$  $\therefore \overline{BC} < \overline{AB} < \overline{AC} \checkmark$ 2.  $m \angle P + m \angle V + m \angle C =$ 180° ✓  $117^{\circ} + 27^{\circ} + m \angle C = 180^{\circ}$  $144^{\circ} + m \angle C = 180^{\circ} \checkmark$  $m\angle C = 180^{\circ} - 144^{\circ}$   $\checkmark$  $m \angle C = \boxed{36^{\circ}} \checkmark$  $\angle V < \angle \overline{C} < \angle P \checkmark$  $\therefore \overline{CP} < \overline{PV} < \overline{CV} \checkmark$ 

1. 6+17>12  $\checkmark$ 23 > 12 ✓ True < 17 + 12 > 6  $\checkmark$ 29 > 6 ✓ True < 6+12 > 1718 > 17 ✓  $40^{\circ} + 89^{\circ} + m \angle C = 180^{\circ} \checkmark$ True < ∴ Yes 🗸 2. 14 + 33 > 19  $\checkmark$ 47 > 19 **✓** True < 14 + 19 > 33  $\checkmark$ 33 > 33 ✓ False < 33+19>1452 > 14 **✓** True ∴ No **√** 3. 3.7 + 5.2 > 8.5  $\checkmark$  $8.9 > 8.5 \checkmark$ 3.  $m \angle B + m \angle P + m \angle F = 180^{\circ}$ True ✓ 5.2 + 8.5 > 3.7  $\checkmark$  $38^{\circ} + 92^{\circ} + m \angle F = 180^{\circ} \checkmark$ 13.7 > 3.7 ✓  $130^{\circ} + m \angle F = 180^{\circ} \checkmark$ True <  $m\angle F = 180^{\circ} - 130^{\circ}$   $\checkmark$ 3.7 + 8.5 > 5.2  $\checkmark$  $m\angle F = \boxed{50^{\circ}}$   $\checkmark$ 12.2 > 5.2 ✓  $\angle B < \angle F < \angle P \checkmark$ 

D. 1.  $a + b > c \checkmark$  $5+12>c \checkmark$   $\boxed{17>c}$  $\overline{b+c>a}$   $\checkmark$ 12 + c > 5 $c > 5 - 12 \checkmark$ c > -7 $\overline{a+c>b}$   $\checkmark$ 5 + c > 12  $\checkmark$ c>12-5c > 7∴ 7 < c < 17 ✓ 2.  $a + b > c \checkmark$ 17.4 + 28.1 > c  $\checkmark$  $| 45.5 > c | \checkmark$ b+c>a $28.1 + c > 17.4 \checkmark$  $c > 17.4 - 28.1 \checkmark$ c > -10.7a+c>b $17.4 + c > 28.1 \checkmark$ 

 $\therefore 10.7 < c < 45.5 \checkmark$ 3. a+b>c3+b > c  $\sqrt{7 + b} > 3 + b >$ 

*c* > 10.7 ✓

c > 28.1 - 17.4  $\checkmark$ 

а > *b* 

1.  $m \angle 4 = m \angle 1 + m \angle 2$  $m\angle 4 = 57^{\circ} + 54^{\circ}$   $\checkmark$ *m*∠4 = 111° ✓ 2.  $m \angle 4 = m \angle 1 + m \angle 2 \checkmark$ 

 $150^{\circ} = m \angle 1 + 37^{\circ} \checkmark$  $150^{\circ} - 3\underline{7^{\circ}} = \underline{m} \angle 1 \checkmark$  $m\angle 1 = |113^{\circ}|$ 3.  $m \angle 4 = m \angle 1 + m \angle 2 \checkmark$  $(6x - 4)^{\circ} =$ 

 $(2x+7)^{\circ}+(x+31)^{\circ}$ 6x - 4 = 3x + 38 $6x - 3x = 38 + 4 \checkmark$   $\frac{3x}{3} = \frac{42}{3} \checkmark$   $x = 14^{\circ} \checkmark$ 

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1.  $\overline{BC} < \overline{AC} < \overline{AB}$   $\checkmark$ ∴ ∠A < ∠B < ∠C ✓

 $\therefore \overline{FP} < \overline{BP} < \overline{BF} \checkmark$ 

В

2.  $\overline{DF} < \overline{EF} < \overline{DE} \checkmark$ ∴ ∠*E* < ∠*D* < ∠*F* ✓ 1.  $m \angle A + m \angle B + m \angle C = 180^{\circ}$  $40^{\circ} + 89^{\circ} + m \angle C = 180^{\circ} \checkmark$  $129^{\circ} + m \angle C = 180^{\circ} \checkmark$  $m\angle C = 180^{\circ} - 129^{\circ}$   $\checkmark$  $m\angle C = \boxed{51^{\circ}}$  $\angle A < \angle C < \angle B \checkmark$  $\therefore \overline{BC} < \overline{AB} < \overline{AC} \checkmark$ 2.  $m \angle P + m \angle V + m \angle C =$ 180° ✓  $117^{\circ} + 27^{\circ} + m \angle C = 180^{\circ}$  $144^{\circ} + m \angle C = 180^{\circ} \checkmark$  $m \angle C = 180^{\circ} - 144^{\circ}$  $m\angle C = \boxed{36^{\circ}}$   $\checkmark$ 

 $\angle V < \angle \overline{C} < \angle P \checkmark$  $\therefore \overline{CP} < \overline{PV} < \overline{CV} \checkmark$ 3.  $m \angle B + m \angle P + m \angle F = 180^{\circ}$  $38^{\circ} + 92^{\circ} + m \angle F = 180^{\circ} \checkmark$  $130^{\circ} + m \angle F = 180^{\circ} \checkmark$  $m \angle F = 180^{\circ} - 130^{\circ} \checkmark$  $m\angle F = \boxed{50^{\circ}}$  $\angle B < \angle F < \angle P \checkmark$  $\therefore \overline{FP} < \overline{BP} < \overline{BF} \checkmark$ 

C.

23 > 12 ✓ True ✓ 17 + 12 > 6  $\checkmark$  $29 > 6 \checkmark$ True < 6+12 > 17  $\checkmark$ 18 > 17 ✓ True < ∴ Yes 🗸 2. 14 + 33 > 19  $\checkmark$ 

1. 6+17>12  $\checkmark$ 

True

∴ Yes 🗸

47 > 19 **√** True ✓ 14 + 19 > 33  $\checkmark$ 33 > 33 ✓ False ✓ 33 + 19 > 14  $\checkmark$ 52 > 14 **√** True ✓ ∴ No **√** 3. 3.7 + 5.2 > 8.5  $\checkmark$  $8.9 > 8.5 \checkmark$ 

True ✓ 5.2 + 8.5 > 3.7  $\checkmark$  $13.7 > 3.7 \checkmark$ True < 3.7 + 8.5 > 5.2  $\checkmark$  $12.2 > 5.2 \checkmark$ True ✓ ∴ Yes 🗸

1.  $a + b > c \checkmark$  $5+12 > c \checkmark$ 17 > c ✓ b+c>a12 + c > 5  $\checkmark$  $c > 5 - 12 \checkmark$ c > -7a+c>b5 + c > 12  $\checkmark$ c > 12 - 5  $\checkmark$ *c* > 7 ✓  $\therefore \overline{7 < c} < 17 \checkmark$ 

2.  $a + b > c \checkmark$ 17.4 + 28.1 > c  $\checkmark$ 45.5 > cb+c>a28.1 + c > 17.4  $\checkmark$  $c > 17.4 - 28.1 \checkmark$ c > -10.7a+c>b $17.4 + c > 28.1 \checkmark$ c > 28.1 - 17.4  $\checkmark$ c > 10.710.7 < c < 45.5  $\checkmark$ 

3.  $a+b>c \checkmark$   $7\frac{1}{4}+b>3\frac{1}{2} \checkmark$   $b>3\frac{1}{2}-7\frac{1}{4} \checkmark$ 

 $\overline{b+c}$ > a 🗸 b+3> 7 4  $\overline{a+c>b}$   $\checkmark$ +3> *b* 

1.  $m \angle 4 = m \angle 1 + m \angle 2 \checkmark$  $m\angle 4 = 57^{\circ} + 54^{\circ}$   $\checkmark$ *m*∠4 = 111° ✓

2. *m*∠4 = *m*∠1 + *m*∠2 ✓  $150^{\circ} = m \angle 1 + 37^{\circ} \checkmark$  $150^{\circ} - 37^{\circ} = m \angle 1 \checkmark$  $m\angle 1 = \boxed{113^{\circ}}$   $\checkmark$ 

3.  $m \angle 4 = m \angle 1 + m \angle 2 \checkmark$  $(6x - 4)^{\circ} =$  $(2x+7)^{\circ}+(x+31)^{\circ}$ 6x - 4 = 3x + 38  $\checkmark$  $6x - 3x = 38 + 4 \checkmark$   $\frac{3x}{3} = \frac{42}{3} \checkmark$  $x = 14^{\circ}$