

Activity 4.3.1: Applying Theorems on Triangle Inequality

Total points = 103

A. Answers

1. No ✓

3. No ✓

5. No ✓
2. Yes ✓

4. Yes ✓

B. Answers

1. $10 - 9 < x < 10 + 9$ ✓
 $1 < x < 19$ ✓

4. $6.5 - 3.5 < x < 6.5 + 3.5$ ✓
 $3 < x < 10$ ✓
2. $20 - 10 < x < 20 + 10$ ✓
 $10 < x < 30$ ✓

5. $10 - 6 < x < 10 + 6$ ✓
 $4 < x < 16$ ✓
3. $60 - 5 < x < 60 + 5$ ✓

C. Answers

1. $AB > AC > BC$ ✓
 $\angle C > \angle B > \angle A$ ✓
∴ Largest: $\angle C$, ✓
Smallest: $\angle A$ ✓

4. $JL > JK > KL$ ✓
 $\angle K > \angle L > \angle J$ ✓
∴ Largest: $\angle K$, ✓
Smallest: $\angle J$ ✓
2. $DF > EF > DE$ ✓
 $\angle E > \angle D > \angle F$ ✓
∴ Largest: $\angle E$, ✓
Smallest: $\angle F$ ✓

5. $MP > NP > MN$ ✓
 $\angle N > \angle M > \angle P$ ✓
∴ Largest: $\angle N$, ✓
Smallest: $\angle P$ ✓
3. $HI > GH > GI$ ✓
 $\angle G > \angle I > \angle H$ ✓

D. Answers

1. $m\angle A + m\angle B + m\angle C = 180^\circ$ ✓
 $25^\circ + 113^\circ + m\angle C = 180^\circ$ ✓
 $138^\circ + m\angle C = 180^\circ$ ✓
 $138^\circ - 138^\circ + m\angle C = 180^\circ - 138^\circ$ ✓
 $m\angle C = 42^\circ$ ✓
 $m\angle B > m\angle C > m\angle A$ ✓
 $AC > AB > BC$ ✓
∴ Longest: \overline{AC} , ✓ Shortest: \overline{BC} ✓

2. $m\angle D + m\angle E + m\angle F = 180^\circ$ ✓
 $18^\circ + m\angle E + 57^\circ = 180^\circ$ ✓
 $m\angle E + 75^\circ = 180^\circ$ ✓
 $m\angle E + 75^\circ - 75^\circ = 180^\circ - 75^\circ$ ✓
 $m\angle E = 105^\circ$ ✓
 $m\angle E > m\angle F > m\angle D$ ✓
 $DF > DE > EF$ ✓
∴ Longest: \overline{DF} , ✓ Shortest: \overline{EF} ✓

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C. Answers

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∴ Largest: $\angle C$, ✓
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Smallest: $\angle F$ ✓

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 $\angle N > \angle M > \angle P$ ✓
∴ Largest: $\angle N$, ✓
Smallest: $\angle P$ ✓
3. $HI > GH > GI$ ✓
 $\angle G > \angle I > \angle H$ ✓

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 $m\angle C = 42^\circ$ ✓
 $m\angle B > m\angle C > m\angle A$ ✓
 $AC > AB > BC$ ✓
∴ Longest: \overline{AC} , ✓ Shortest: \overline{BC} ✓

2. $m\angle D + m\angle E + m\angle F = 180^\circ$ ✓
 $18^\circ + m\angle E + 57^\circ = 180^\circ$ ✓
 $m\angle E + 75^\circ = 180^\circ$ ✓
 $m\angle E + 75^\circ - 75^\circ = 180^\circ - 75^\circ$ ✓
 $m\angle E = 105^\circ$ ✓
 $m\angle E > m\angle F > m\angle D$ ✓
 $DF > DE > EF$ ✓
∴ Longest: \overline{DF} , ✓ Shortest: \overline{EF} ✓

3. $m\angle G + m\angle H + m\angle I = 180^\circ$ ✓
 $m\angle G + 35^\circ + 110^\circ = 180^\circ$ ✓
 $m\angle G + 145^\circ = 180^\circ$ ✓
 $m\angle G + 145^\circ - 145^\circ = 180^\circ - 145^\circ$ ✓
 $m\angle G = 35^\circ$ ✓
 $m\angle I > m\angle G = m\angle H$ ✓
 $GH > HI = GI$ ✓
∴ Longest: \overline{GH} , ✓ Shortest: \overline{HI} or \overline{GI} ✓

E. Answers

1. $m\angle A + m\angle B + m\angle C = 180^\circ$ ✓
 $7x - 2 + 20x - 10 + 6x - 6 = 180^\circ$ ✓
 $33x - 18 = 180^\circ$ ✓
 $33x - 18 + 18 = 180^\circ + 18$ ✓
 $\frac{33x}{33} = \frac{198}{33}$ ✓
 $x = 6$ ✓
 $m\angle A = 7x - 2$ ✓
 $m\angle A = 7(6) - 2$ ✓
 $m\angle A = 42 - 2$ ✓
 $m\angle A = 40^\circ$ ✓
 $m\angle C = 6x - 6$ ✓
 $m\angle C = 6(6) - 6$ ✓
 $m\angle C = 36 - 6$ ✓
 $m\angle C = 30^\circ$ ✓
 $m\angle C < m\angle A < m\angle B$ ✓
∴ $\overline{AB} < \overline{BC} < \overline{AC}$ ✓

2. $m\angle D + m\angle E + m\angle F = 180^\circ$ ✓
 $7x - 4 + 17x - 4 + 2x + 6 = 180^\circ$ ✓
 $26x - 2 = 180^\circ$ ✓
 $26x - 2 + 2 = 180^\circ + 2$ ✓
 $\frac{26x}{26} = \frac{182}{26}$ ✓
 $x = 7$ ✓
 $m\angle D = 7x - 4$ ✓
 $m\angle D = 7(7) - 4$ ✓
 $m\angle D = 49 - 4$ ✓
 $m\angle D = 45^\circ$ ✓
 $m\angle F = 2x + 6$ ✓
 $m\angle F = 2(7) + 6$ ✓
 $m\angle F = 14 + 6$ ✓
 $m\angle F = 20^\circ$ ✓
 $m\angle F < m\angle D < m\angle E$ ✓
∴ $\overline{DE} < \overline{EF} < \overline{DF}$ ✓
- $m\angle B = 20x - 10$ ✓
 $m\angle B = 20(6) - 10$ ✓
 $m\angle B = 120 - 10$ ✓
 $m\angle B = 110^\circ$ ✓

3. $m\angle G + m\angle H + m\angle I = 180^\circ$ ✓
 $m\angle G + 35^\circ + 110^\circ = 180^\circ$ ✓
 $m\angle G + 145^\circ = 180^\circ$ ✓
 $m\angle G + 145^\circ - 145^\circ = 180^\circ - 145^\circ$ ✓
 $m\angle G = 35^\circ$ ✓
 $m\angle I > m\angle G = m\angle H$ ✓
 $GH > HI = GI$ ✓
∴ Longest: \overline{GH} , ✓ Shortest: \overline{HI} or \overline{GI} ✓

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 $33x - 18 + 18 = 180^\circ + 18$ ✓
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 $x = 6$ ✓
 $m\angle A = 7x - 2$ ✓
 $m\angle A = 7(6) - 2$ ✓
 $m\angle A = 42 - 2$ ✓
 $m\angle A = 40^\circ$ ✓
 $m\angle C = 6x - 6$ ✓
 $m\angle C = 6(6) - 6$ ✓
 $m\angle C = 36 - 6$ ✓
 $m\angle C = 30^\circ$ ✓
 $m\angle C < m\angle A < m\angle B$ ✓
∴ $\overline{AB} < \overline{BC} < \overline{AC}$ ✓

2. $m\angle D + m\angle E + m\angle F = 180^\circ$ ✓
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 $26x - 2 + 2 = 180^\circ + 2$ ✓
 $\frac{26x}{26} = \frac{182}{26}$ ✓
 $x = 7$ ✓
 $m\angle D = 7x - 4$ ✓
 $m\angle D = 7(7) - 4$ ✓
 $m\angle D = 49 - 4$ ✓
 $m\angle D = 45^\circ$ ✓
 $m\angle F = 2x + 6$ ✓
 $m\angle F = 2(7) + 6$ ✓
 $m\angle F = 14 + 6$ ✓
 $m\angle F = 20^\circ$ ✓
 $m\angle F < m\angle D < m\angle E$ ✓
∴ $\overline{DE} < \overline{EF} < \overline{DF}$ ✓
- $m\angle B = 20x - 10$ ✓
 $m\angle B = 20(6) - 10$ ✓
 $m\angle B = 120 - 10$ ✓
 $m\angle B = 110^\circ$ ✓