Question 1: Constraining Stress Magnitudes using the Stress Polygon

a. What is the value of the minimum horizontal stress of the point 1 in Figure 1 in psi?
6515.77 +- 651.577

$$S_{h\min} = \frac{S_V - P_p}{(\sqrt{\mu^2+1}+\mu)^2} + P_p$$

b. What is the value of the maximum horizontal stress of the point 1 in Figure 1 in psi?
10271.9 +- 1027.19

$$S_{H\max} = \frac{C_o + 2P_p + (P_m - P_p) - \left(\dfrac{S_V - P_p}{(\sqrt{\mu^2+1}+\mu)^2} + P_p\right)(1+2\cos(\pi - w_{bo}))}{1-2\cos(\pi - w_{bo})}$$

c. What is the value of the minimum horizontal stress of the point 2 in Figure 1 in psi?
12150 +- 1215.0

$$S_{h\min} = \frac{C_o + 2P_p + (P_m - P_p)}{2}$$

d. What is the value of the maximum horizontal stress of the point 2 in Figure 1 in psi?
12150 +- 1215.0

$$S_{H\max} = \frac{C_o + 2P_p + (P_m - P_p)}{2}$$

e. What is the value of the minimum horizontal stress of the point 3 in Figure 1 in psi?
6515.77 +- 651.577

$$S_{h\min} = \frac{S_V - P_p}{(\sqrt{\mu^2+1}+\mu)^2} + P_p$$

f. What is the value of the maximum horizontal stress of the point 3 in Figure 1 in psi?
9247.31 +- 924.731

$$S_{H\max} = \frac{3S_V - 3P_p}{(\sqrt{\mu^2+1}+\mu)^2} + P_p - (P_m - P_p) - T_o$$

g. What is the value of the minimum horizontal stress of the point 4 in Figure 1 in psi?
11762.7 +- 1176.27

$$S_{h\min} = \frac{(\sqrt{\mu^2+1}+\mu)^2(S_V - P_p) + 3P_p + (P_m - P_p) + T_o}{3}$$

h. What is the value of the maximum horizontal stress of the point 4 in Figure 1 in psi?
24988.2 +- 2498.82

$$S_{H\max} = (\sqrt{\mu^2+1}+\mu)^2(S_V - P_p) + P_p$$

i. What is the value of the minimum horizontal stress of the point 5 in Figure 1 in psi?
6900 +- 690.0

$$S_{h\min} = \frac{C_o + 2P_p + (P_m - P_p) + (2P_p + (P_m - P_p) + T_o)(1 - 2\cos(\pi - w_{bo}))}{4(1-\cos(\pi - w_{bo}))}$$

j. What is the value of the maximum horizontal stress of the point 5 in Figure 1 in psi?
10400 +- 1040.0

$$S_{H\max} = \frac{3C_o + 6P_p + 3(P_m - P_p) + 3(2P_p + (P_m - P_p) + T_o)(1 - 2\cos(\pi - w_{bo}))}{4(1-\cos(\pi - w_{bo}))} - 2P_p - (P_m - P_p) - T_o$$