1. (a) $| p - p^* | = 0.00126448926$
   $\frac{|p-p^*|}{|p|} = 4.025 \times 10^{-4}$
   (b) $| p - p^* | = 7.3464 \times 10^{-6}$
   $\frac{|p-p^*|}{|p|} = 2.33843 \times 10^{-6}$
   (c) $| p - p^* | = 2.8182845 \times 10^{-4}$
   $\frac{|p-p^*|}{|p|} = 1.0367889 \times 10^{-4}$
   (d) $| p - p^* | = 0.2728$
   $\frac{|p-p^*|}{|p|} = 0.19290$

2. (a)

$$\frac{| \pi - P^* |}{\pi} \leq 10^{-4} \iff | \pi - P^* | \leq \pi \times 10^{-4} \iff -\pi \times 10^{-4} \leq \pi - P^* \leq \pi \times 10^{-4}$$
$$\pi + -\pi \times 10^{-4} \leq P^* \leq \pi + \pi \times 10^{-4}$$
$$P^* \in [\pi - \pi \times 10^{-4}, \pi + \pi \times 10^{-4}]$$
$$P^* \in [3.141278, 3.141907]$$

   (b)

$$-e \times 10^{-4} \leq e - P^* \leq e \times 10^{-4}$$
$$e + -e \times 10^{-4} \leq P^* \leq e + e \times 10^{-4}$$
$$P^* \in [e - e \times 10^{-4}, e + e \times 10^{-4}]$$
$$P^* \in [2.718010, 2.718553]$$

   (c)

$$-\sqrt{2} \times 10^{-4} \leq \sqrt{2} - P^* \leq \sqrt{2} \times 10^{-4}$$
$$\sqrt{2} + -\sqrt{2} \times 10^{-4} \leq P^* \leq \sqrt{2} + \sqrt{2} \times 10^{-4}$$
$$P^* \in [\sqrt{2} - \sqrt{2} \times 10^{-4}, \sqrt{2} + \sqrt{2} \times 10^{-4}]$$
$$P^* \in [1.414072, 1.414354]$$

   (d)

$$-\sqrt[3]{7} \times 10^{-4} \leq \sqrt[3]{7} - P^* \leq \sqrt[3]{7} \times 10^{-4}$$
$$\sqrt[3]{7} + -\sqrt[3]{7} \times 10^{-4} \leq P^* \leq \sqrt[3]{7} + \sqrt[3]{7} \times 10^{-4}$$
$$P^* \in [\sqrt[3]{7} - \sqrt[3]{7} \times 10^{-4}, \sqrt[3]{7} + \sqrt[3]{7} \times 10^{-4}]$$
$$P^* \in [1.912667, 1.913195]$$

   (a) i. $17/15 = 1.1\overline{33}$
   ii. 1.13
   iii. 1.13
   iv. 0.00294, 0.00294
   (b) i. $4/15 = 0.2\overline{66}$
   ii. 0.266
   iii. 0.267
   iv. 0.025, 0.0125
   (c) i. $139/660 = 0.210\overline{60}$
   ii. 0.210

iii. 0.211

iv. 0.00287, 0.00187

(d) i. $301/660 = 0.45\overline{60}$

ii. 0.456

iii. 0.456

iv. 0.000132, 0.000132