A. Estimate as a power of 10:
(a) \(230\)
\[230 = (2^{10})^3 \approx (10^3)^3 = 10^9\]
Answer: \(230 \approx 10^9\)

In B-E: simplify to a number of the form \(b^n\):

B. \((5\sqrt{3})^\sqrt{3}\)
\[(5\sqrt{3})^\sqrt{3} = 5\sqrt{3} \cdot \sqrt{3} = 5^3 = 125\]
Answer: 125

C. \((4^{1+\sqrt{2}})(4^{1-\sqrt{2}})\)
\[(4^{1+\sqrt{2}})(4^{1-\sqrt{2}}) = 4^{(1+\sqrt{2} + 1-\sqrt{2})} = 4^2 = 16\]
Answer: 16

D. \(\frac{2^{4+\pi}}{2^{1+\pi}}\)
\[\frac{2^{4+\pi}}{2^{1+\pi}} = 2^{(4+\pi)-(1+\pi)} = 2^{4+\pi-1-\pi} = 2^3 = 8\]
Answer: 8

E. \((\sqrt[5]{\pi})^2\)
\[(\sqrt[5]{\pi})^2 = (\sqrt[5]{\pi})^{\pi-\pi} = (\sqrt[5]{\pi}) = 5^{\sqrt{2}}\]
Answer: \(5^{\sqrt{2}}\)

F. Solve for \(y\):
\[3^{1-2y} = \sqrt{3}\]
\[3^{1-2y} = \sqrt{3} \iff 3^{1-2y} = 3^{1/2}\]
\[1 - 2y = 1/2 \iff 2 - 4y = 1 \iff -4y = -1 \iff y = 1/4\]
Answer: \(y = 1/4\)

G. Solve for \(z\):
\[3^z = 9\sqrt{3}\]
\[3^z = 9\sqrt{3} \iff 3^z = 3^{3/2}\]
\[iff \ 3^z = 3^{5/2} \iff z = 5/2\]
Answer: \(z = 5/2\)

H. Graph and on the graph mark the \(x\)-intercept, \(y\)-intercept, and horizontal asymptote.
\[y = -2^x + 1\]
Start with \(2^x\), reflect around \(x\)-axis, shift up 1.

I. Graph and on the graph mark the \(x\)-intercept, \(y\)-intercept, and horizontal asymptote.
\[y = 3^{-x} + 1\]
Start with \(3^x\), reflect across \(y\)-axis, shift up 1.

J. Graph and on the graph mark the \(x\)-intercept, \(y\)-intercept, and horizontal asymptote.
\[y = 2^{x-1}\]
Start with \(2^x\) and shift right 1.

K. Graph and on the graph mark the \(x\)-intercept, \(y\)-intercept, and horizontal asymptote.
\[y = -e^{x-2}\]
Start with \(e^x\), shift right 2 units, reflect across \(x\)-axis.

Math 140     Hw 11     Worked examples of selected recommended problems.