Source:

#source openstax calculus volume 1 section 2.4 exercises

1 | **131**

$$x \leq 0 \implies \boxed{\text{infinite}}$$

2 | **132**

$$\boxed{\text{no discontinuities}}$$

3 | **140**

$$\boxed{\text{Infinite discontinuity}} \left(\frac{-1}{0}\right)$$

4 | **141**

$$\boxed{\text{Continuous}} \left(\frac{\cancel{(2u-1)}(3u+2)}{\cancel{2u-1}}\right)$$

5 | **145**

$$3x + 2 = 2x - 3 \implies \boxed{x = -5}$$

6 | **150**

$$\boxed{\text{The function is not continuous at } x = 2}$$

7 | **152**

7.1 | **a**

$$\cos t = t^3$$

7.2 | **b**

Let $f(x) = \cos x$ and $g(x) = x^3$. For $a = 0$ and $b = \frac{\pi}{2}$:

$$\begin{aligned} f(a) &= 1 \\ g(a) &= 0 \\ f(b) &= 0 \\ g(b) &= \frac{\pi^3}{8} > 1 \end{aligned}$$

Because these functions each traverse $0 \leq y \leq 1$ over the interval $0 \leq x \leq \frac{\pi}{2}$ in opposite directions and are continuous over that range, they must cross somewhere in that range.

7.3 | **c**

$$\boxed{x = 0.8655 \pm 0.005}$$

8 | **164**

It's true.