You may use the front flap and appendices of your textbook for this quiz. Neatly show all of your work.

I. Suppose the continuous random variable X has p.d.f. $f(x)$ and c.d.f. $F(x)$ both given below. You are also given a graph of the p.d.f. below. Please answer the following questions. (12 points total)

$$F(x) = \begin{cases} 0, & x \le -2 \\ \dfrac{1}{2}x + 1, & -2 \le x \le -1 \\ 1/2, & -1 \le x \le 1 \\ \dfrac{1}{2}x^2 - x + 1, & 1 \le x \le 2 \\ 1, & x \ge 2 \end{cases}$$

$$f(x) = \begin{cases} 1/2, & -2 \le x \le -1 \\ x - 1, & 1 \le x \le 2 \\ 0, & elsewhere \end{cases}$$

(a) Represent the probability $P\left(-\dfrac{3}{2} \le X \le \dfrac{3}{2}\right)$ on the graph of the p.d.f. to your right. (2 points)

(b) Find the probability in part (a) <u>using two of the following three methods</u>: 1. Graphically (i.e. using basic geometry); OR 2. Using the p.d.f. OR 3. Using the c.d.f. <u>Clearly indicate</u> which two methods you use to find the probability. (10 points)

Graph of f(x)
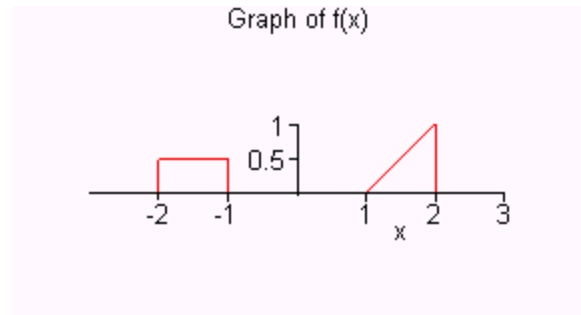
II. Suppose that Y is normally distributed with $\mu = 20$ and $\sigma^2 = 16$. Please answer the following: (4 points each, 8 total)

(a) Find $P(17 \le Y \le 25)$ and graph this probability on the p.d.f. of Y shown to the right.

(b) Find the value of c so that $P(Y > c) = 0.0212$. Show the probability and the value of c on the graph of p.d.f. of Y shown to the right.