Discrete Random Variables

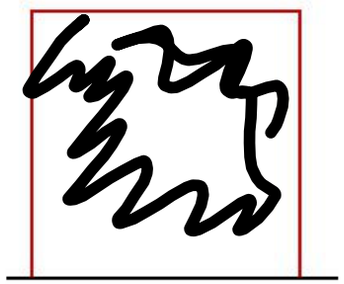
- Topics: Probability in Density Curves
- Objective: Students will be able to calculate probabilities using desity curves.
- Standards: AP Stats: VAR-6 (EU), VAR-6.A (LO), VAR-6.A.2 (EK), VAR-6.A.3 (EK), VAR-6.B (LO), VAR-6.B.1 (EK), VAR-6.B.2 (EK)

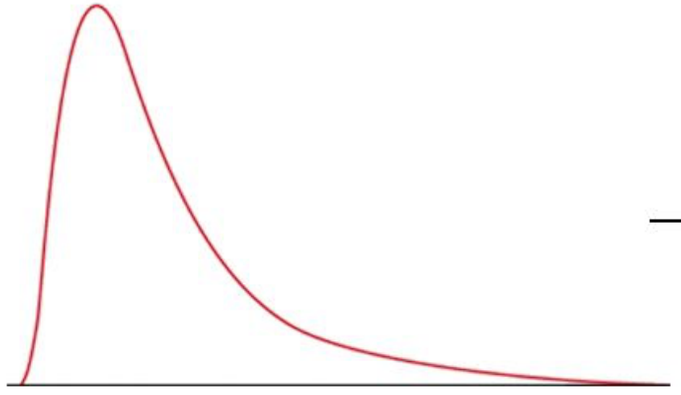
Probability in a Density Curve

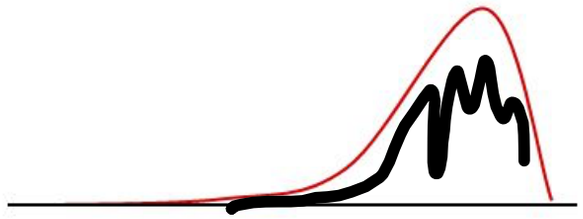
Definition: A ***density curve*** is a graph that shows probability. The area under the density curve is equal to 100 percent of all probabilities.

Example 1:

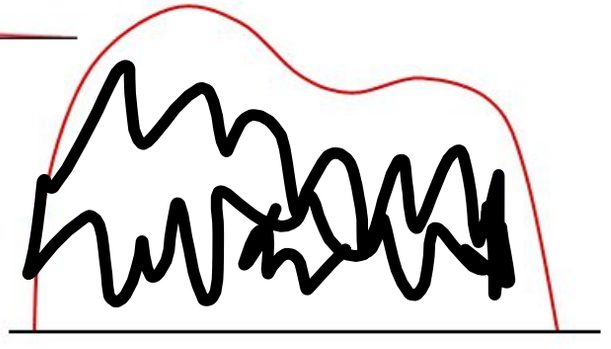
Density curves come in any imaginable shape.







Some are well-known mathematically and others aren't.



Probability in a Density Curve

Definition: A ***density curve*** is a graph that shows probability. The area under the density curve is equal to 100 percent of all probabilities.

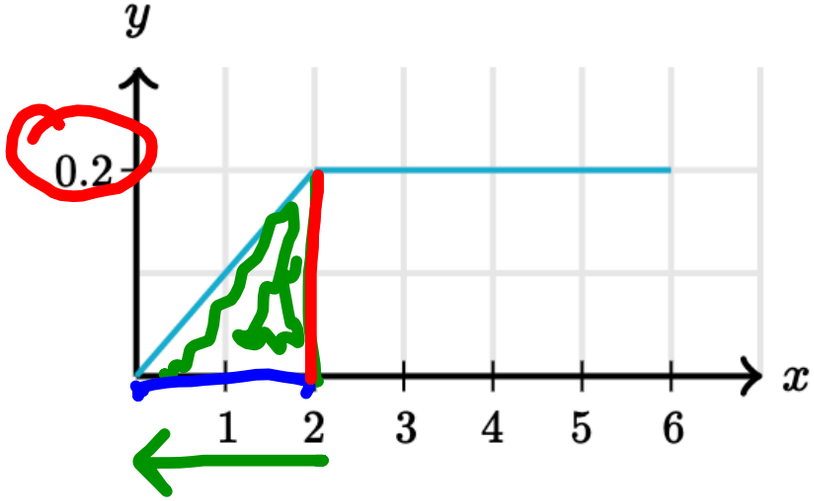
Example 1:

$$\text{Area}_{\Delta} = \frac{1}{2} b \cdot h$$

$$= \frac{1}{2}(2)(.2)$$

$$=$$

Consider the density curve below.



Find the probability that x is less than 2.

$P(x < 2) =$ .20

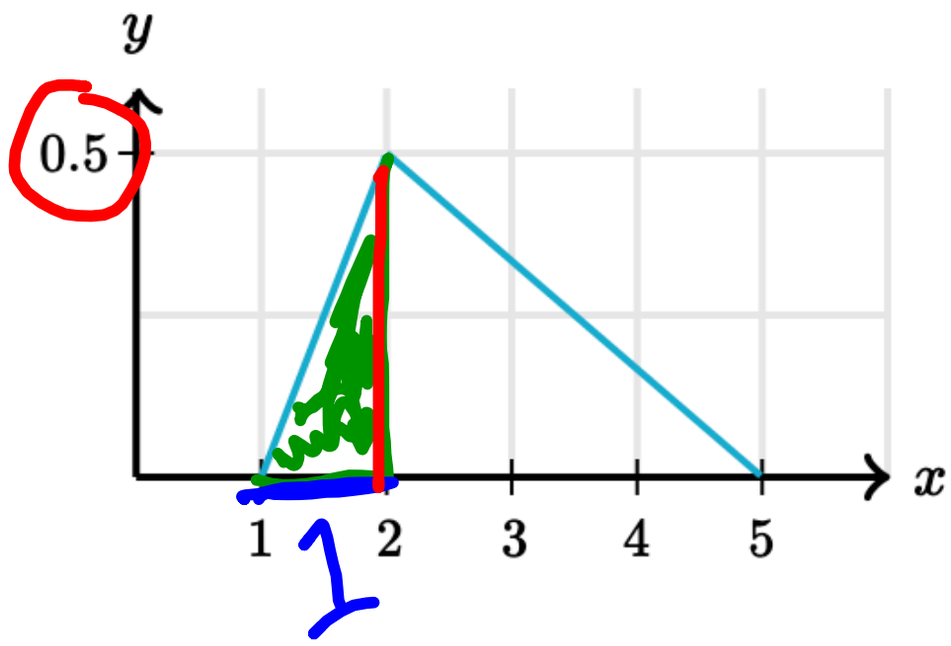
Probability in a Density Curve

Example 2:

$A_\Delta = \frac{1}{2} b \cdot h$

$\frac{1}{2} \cdot 1 \cdot (.5)$

Consider the density curve below.



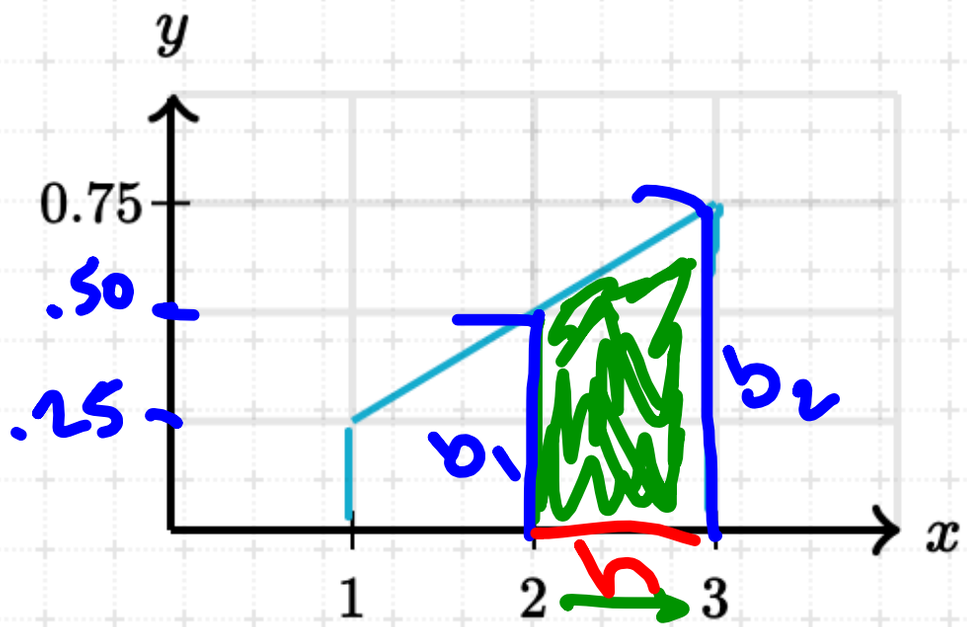
Find the probability that x is less than 2.

$P(x < 2) =$ .25 $\frac{1}{4}$

Probability in a Density Curve

Example 3:

Consider the density curve below.



Find the probability that x is more than 2.

$P(x > 2) =$ .625 or $\frac{5}{8}$

Area Trapezoid =

$$\frac{(b_1 + b_2)}{2} \cdot h$$

$$\frac{(.50 + .75)}{2} \cdot 1 = .625$$

Do Not Round Answer!

Displaying and Comparing Quantitative Data

You should be working on the following skills:

1. Probability in density curves
2. Probability in normal density curves
3. Transforming random variables