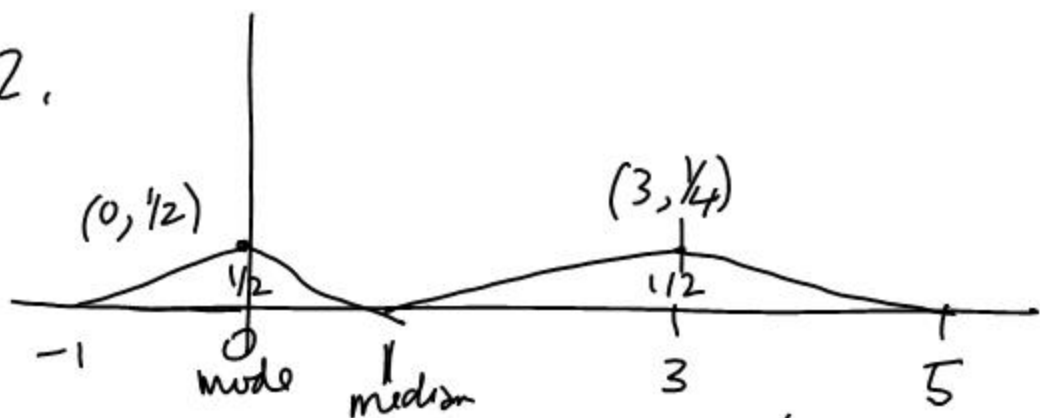


X #2.



$$\begin{aligned} \text{(a) } P(0 \leq X \leq 3 \mid X \geq 1) &= \frac{P(1 \leq X \leq 3)}{P(X \geq 1)} \\ &= \frac{1/4}{1/2} = \frac{2}{4} = \frac{1}{2} \end{aligned}$$

#3 (a) $B(5, 4/5)$

$$P(X=0) = \binom{5}{0} \left(\frac{4}{5}\right)^0 \left(\frac{1}{5}\right)^5 = \frac{1}{3125}$$

$$P(X=5) = \binom{5}{5} \left(\frac{4}{5}\right)^5 \left(\frac{1}{5}\right)^0 = \frac{1024}{3125}$$

$$1 - P(X=0) - P(X=1)$$

$$1 - \frac{1}{3125} - \binom{5}{1} \left(\frac{4}{5}\right)^1 \left(\frac{1}{5}\right)^4$$

$$\frac{3125}{3125} - \frac{1}{3125} - \frac{20}{3125} = \frac{3104}{3125}$$

$$\begin{array}{r} 12 \\ 625 \\ \underline{5} \\ 3125 \\ 22 \\ \underline{25} \quad 6 \\ \quad 4 \\ \underline{\quad} \\ 1024 \end{array}$$

#4. $B(5, 1/2)$

$$P(X=5) = \binom{5}{5} \left(\frac{1}{2}\right)^5 \left(\frac{1}{2}\right)^0 = \frac{1}{32}$$

(b) $E(X) = np = 5\left(\frac{1}{2}\right) = 2.5$

$15 - 2.5 = 12.5$
right wrong

10 for these
he knows

#5 $T \sim Po(m)$ and $E(T^2) = 6$

$$E(T) = m = \text{Var}(T)$$

$$E(T^2) - (E(T))^2 = m$$

$$6 - m^2 = m$$

$$m^2 + m - 6 = 0$$

$$(m-2)(m+3) = 0$$

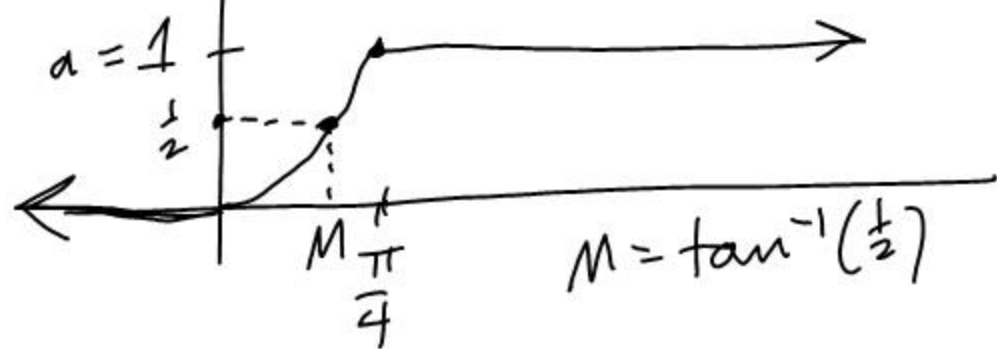
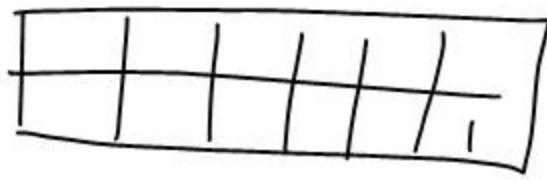
$$\boxed{m = 2}$$

(b) $P(X=0)$

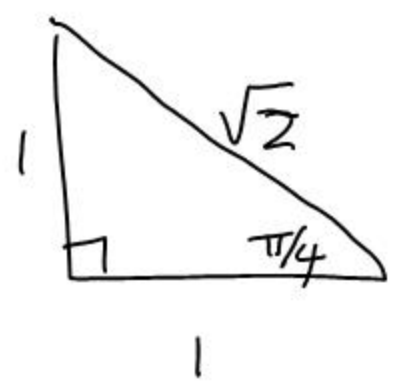
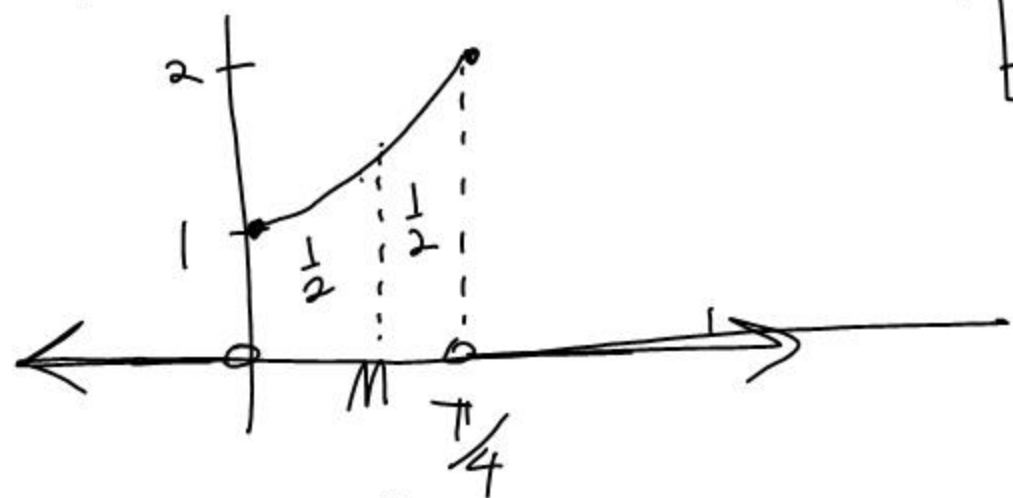
$$= \frac{e^{-2} 2^0}{0!} = \frac{1}{e^2}$$

#6.

$cdf = \tan x$

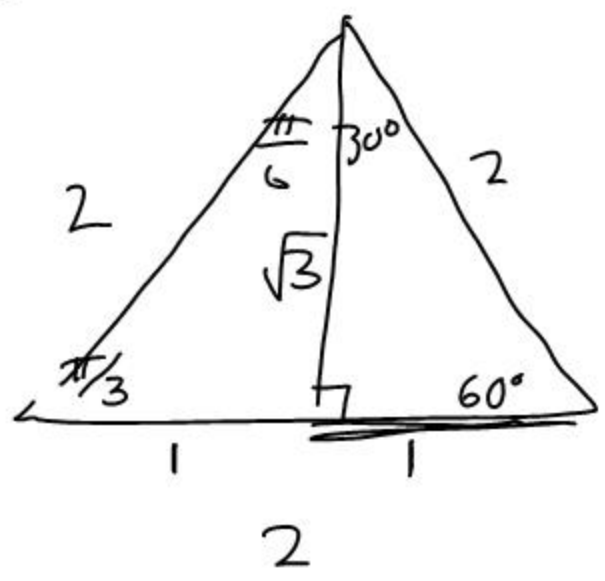


(c) $pdf = \sec^2 x$



(d) $P(X \leq \frac{\pi}{6}) = \int_0^{\pi/6} \sec^2 x dx$

$\text{or } = \tan \frac{\pi}{6}$



#1 $X = \text{width}$

$$X \sim N(20.05, 0.02^2)$$

$$(a) P(20.02 \leq X \leq 20.06) = P(-1.5 \leq Z \leq 0.5)$$

$$\frac{20.02 - 20.05}{0.02} = -1.5$$

$$= \underline{\underline{0.625}}$$

$$\frac{20.06 - 20.05}{0.02} = 0.5$$

$$(b) P(X \leq 20.00) = P(Z \leq -2.5) = \underline{\underline{0.00621}}$$

$$\frac{20.00 - 20.05}{0.02} = -2.5$$

#2 $X = \text{life of motor}$ $X \sim N(15, 2^2)$

$$Z = \text{INVNorm}(0.001) = -3.09023 = \frac{X - 15}{2}$$

$$X = 8.82 \text{ years}$$

Guarantee them for 8 years.

#3

$$\int_0^{\sqrt{k}} \frac{k}{2+x^2} dx = 1 \Rightarrow \underline{\underline{k = 1.80}} \quad (\text{solver})$$

$$(b) P(X \leq \frac{1}{2}) = \int_0^{\frac{1}{2}} \frac{1.8}{2+x^2} dx = \underline{\underline{0.433}}$$

$$(c) E(X) = \int_0^{\sqrt{2}} \frac{1.8x}{2+x^2} dx = \underline{\underline{0.624}}$$

#4. $X = \#$ of monkeys on Catnip's trip

$$X \sim P_0(4)$$

$$(a) P(X \geq 1) = 1 - P(X=0) = \underline{\underline{0.982}}$$

$$(b) P(X > 3) = 1 - P(X \leq 4) = \underline{\underline{0.371}}$$

$$\#5. \int_1^3 \frac{q}{4x-x^2} dx = 1 \Rightarrow \underline{\underline{q = 1.82048}}$$

$$E(X) = \int_1^3 \frac{1.82048x}{4x-x^2} dx = \underline{\underline{2.00}}$$

$$\text{Var}(X) = \int_1^3 (x-2)^2 \left(\frac{1.82048}{4x-x^2} \right) dx = \underline{\underline{0.359}}$$

$$P(X < 2) = \int_1^2 \frac{1.82048}{4x - x^2} dx = \underline{\underline{0.500}}$$