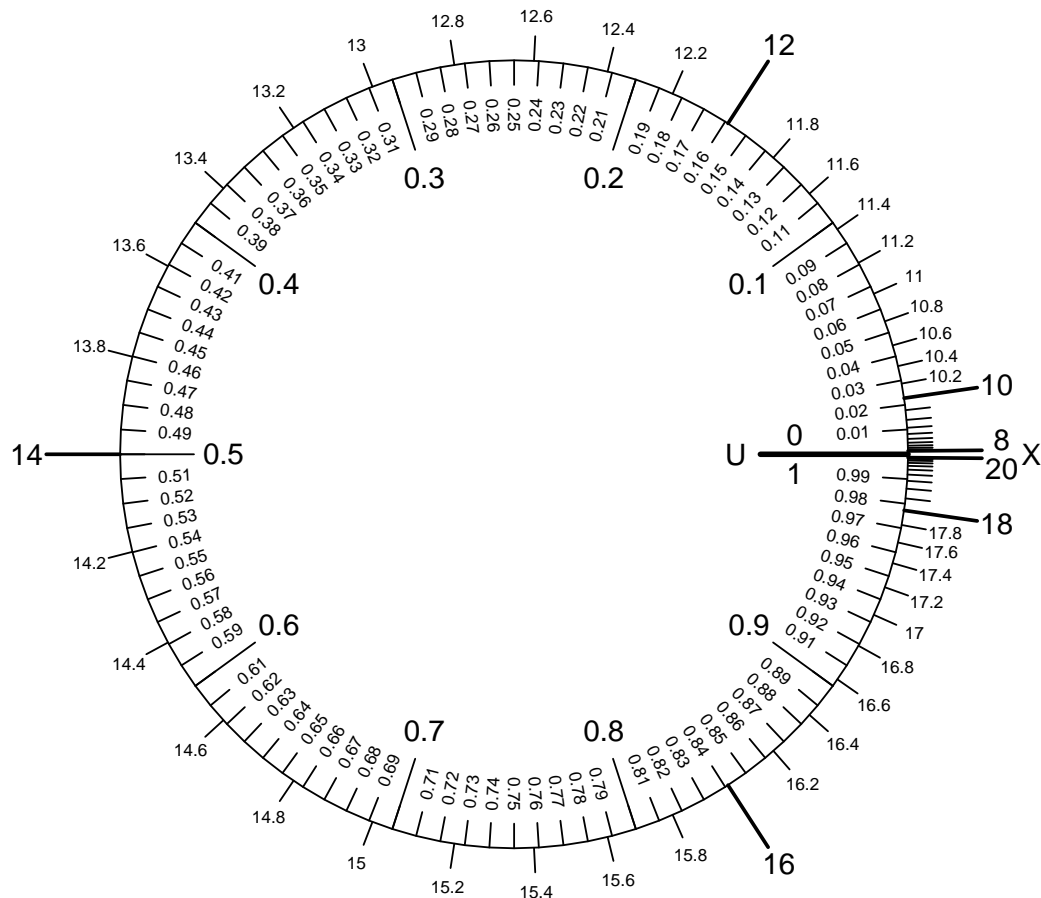


**1. Problem:**

The spinner below has two distributions. The outer distribution ( $X$ ) is a normal distribution with mean  $\mu = 14$  and standard deviation  $\sigma = 2$ .

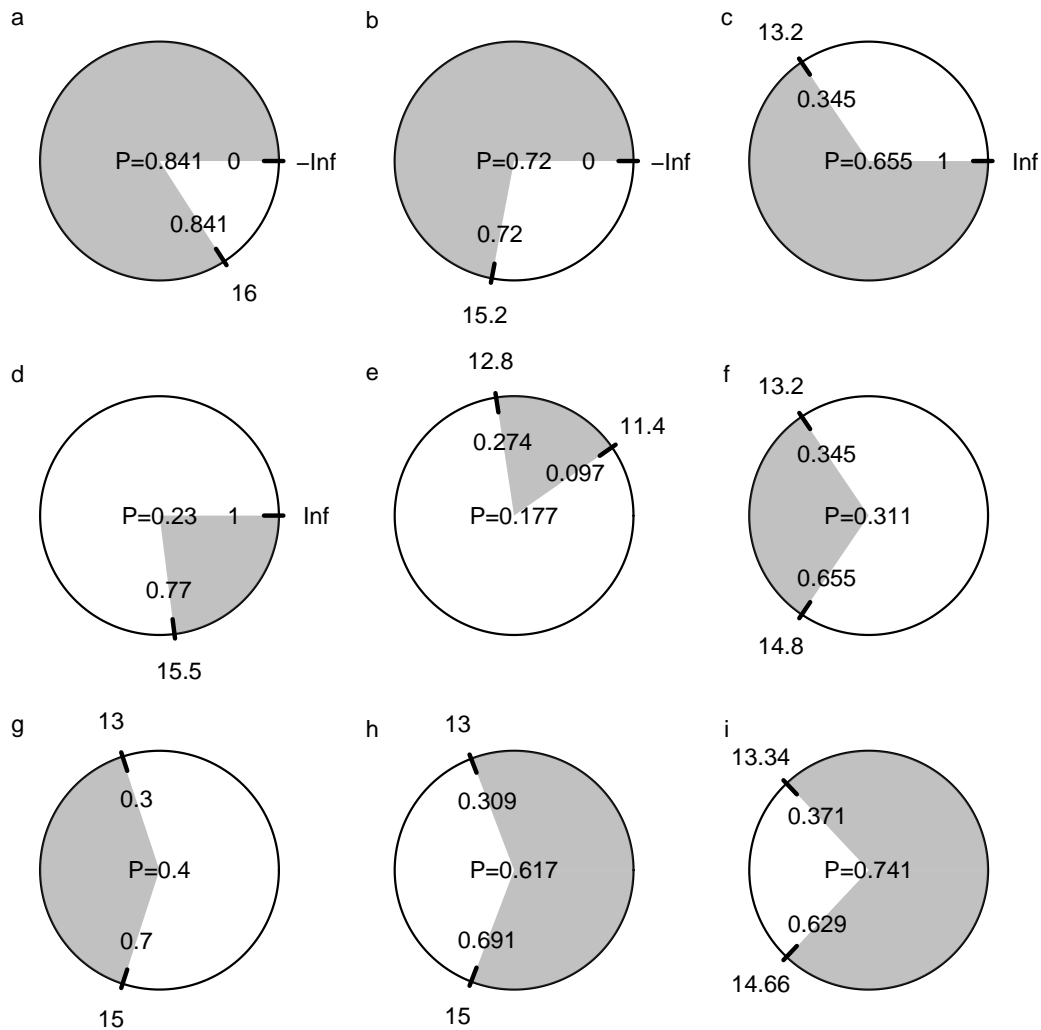
$$X \sim \mathcal{N}(14, 2)$$

The inner distribution ( $U$ ) is the standard uniform distribution.



- Evaluate  $P(X < 16)$
- Determine  $x$  such that  $P(X < x) = 0.72$
- Evaluate  $P(X > 13.2)$
- Determine  $x$  such that  $P(X > x) = 0.23$
- Evaluate  $P(11.4 < X < 12.8)$
- Evaluate  $P(|X - 14| < 0.8)$
- Determine  $a$  such that  $P(|X - 14| < a) = 0.4$
- Evaluate  $P(|X - 14| > 1)$
- Determine  $a$  such that  $P(|X - 14| > a) = 0.74$

**Solution:** The following circles are meant to help visualize how to get the answers.



(a)  $P(X < 16) = 0.841$

(b)  $x = 15.2$

(c)  $P(X > 13.2) = 0.655$

(d)  $x = 15.5$

(e)  $P(11.4 < X < 12.8) = 0.177$

(f)  $P(|X - 14| < 0.8) = 0.311$

(g)  $a = 1.04$

(h)  $P(|X - 14| > 1) = 0.617$

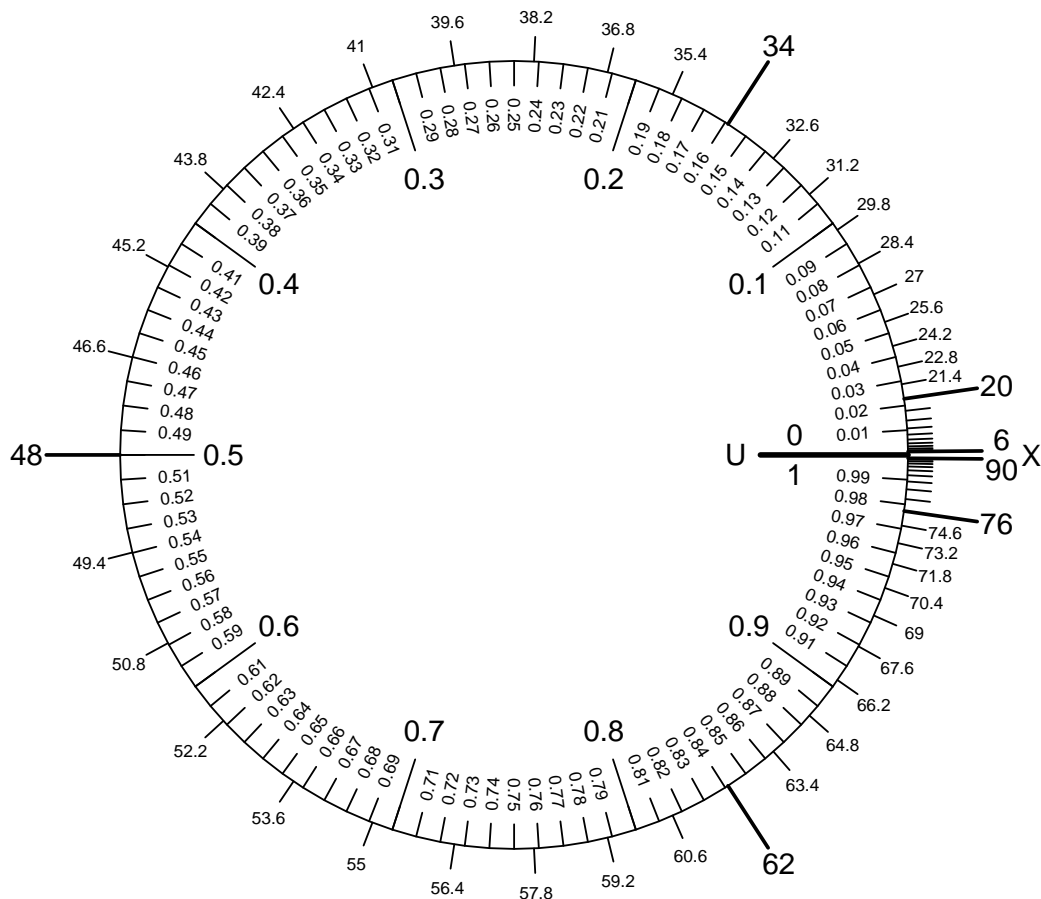
(i)  $a = 0.66$

**2. Problem:**

The spinner below has two distributions. The outer distribution ( $X$ ) is a normal distribution with mean  $\mu = 48$  and standard deviation  $\sigma = 14$ .

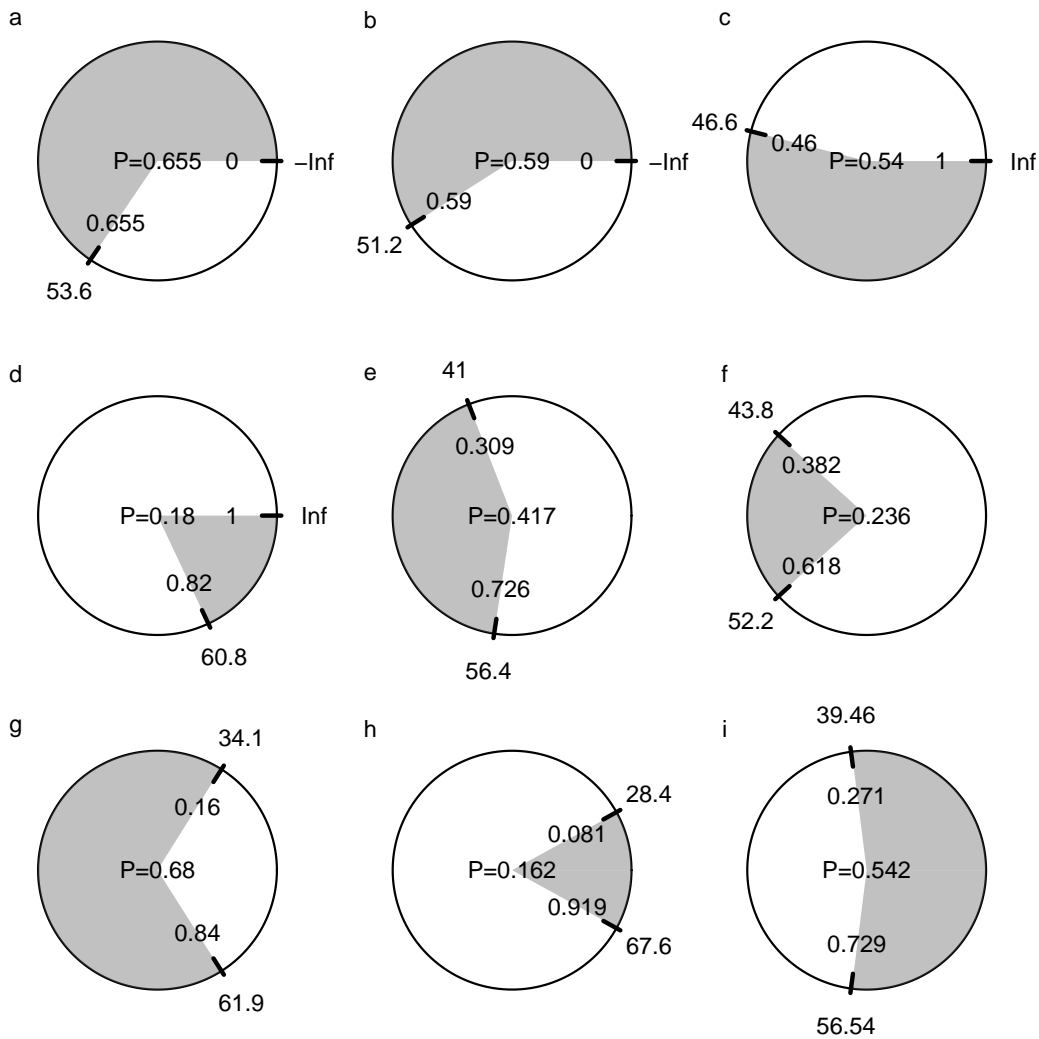
$$X \sim \mathcal{N}(48, 14)$$

The inner distribution ( $U$ ) is the standard uniform distribution.



- Evaluate  $P(X < 53.6)$
- Determine  $x$  such that  $P(X < x) = 0.59$
- Evaluate  $P(X > 46.6)$
- Determine  $x$  such that  $P(X > x) = 0.18$
- Evaluate  $P(41 < X < 56.4)$
- Evaluate  $P(|X - 48| < 4.2)$
- Determine  $a$  such that  $P(|X - 48| < a) = 0.68$
- Evaluate  $P(|X - 48| > 19.6)$
- Determine  $a$  such that  $P(|X - 48| > a) = 0.54$

**Solution:** The following circles are meant to help visualize how to get the answers.



(a)  $P(X < 53.6) = 0.655$

(b)  $x = 51.2$

(c)  $P(X > 46.6) = 0.54$

(d)  $x = 60.9$

(e)  $P(41 < X < 56.4) = 0.417$

(f)  $P(|X - 48| < 4.2) = 0.236$

(g)  $a = 13.86$

(h)  $P(|X - 48| > 19.6) = 0.162$

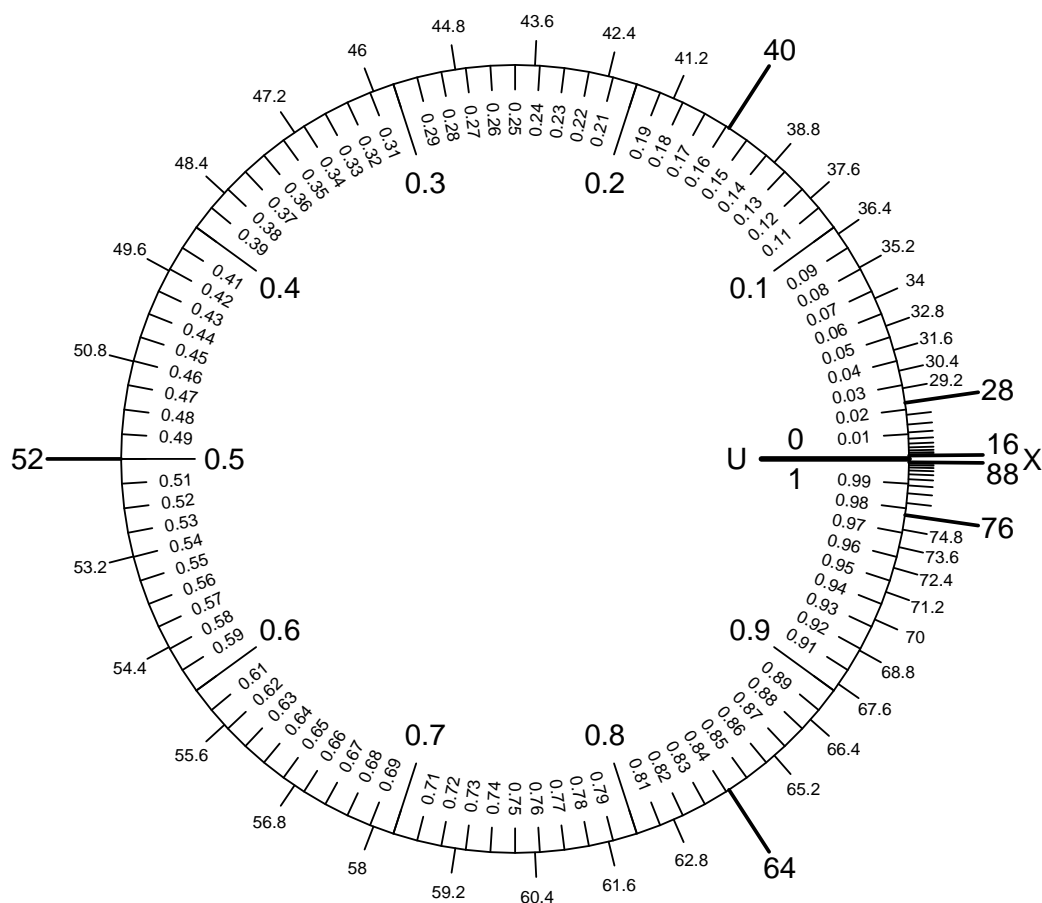
(i)  $a = 8.54$

**3. Problem:**

The spinner below has two distributions. The outer distribution ( $X$ ) is a normal distribution with mean  $\mu = 52$  and standard deviation  $\sigma = 12$ .

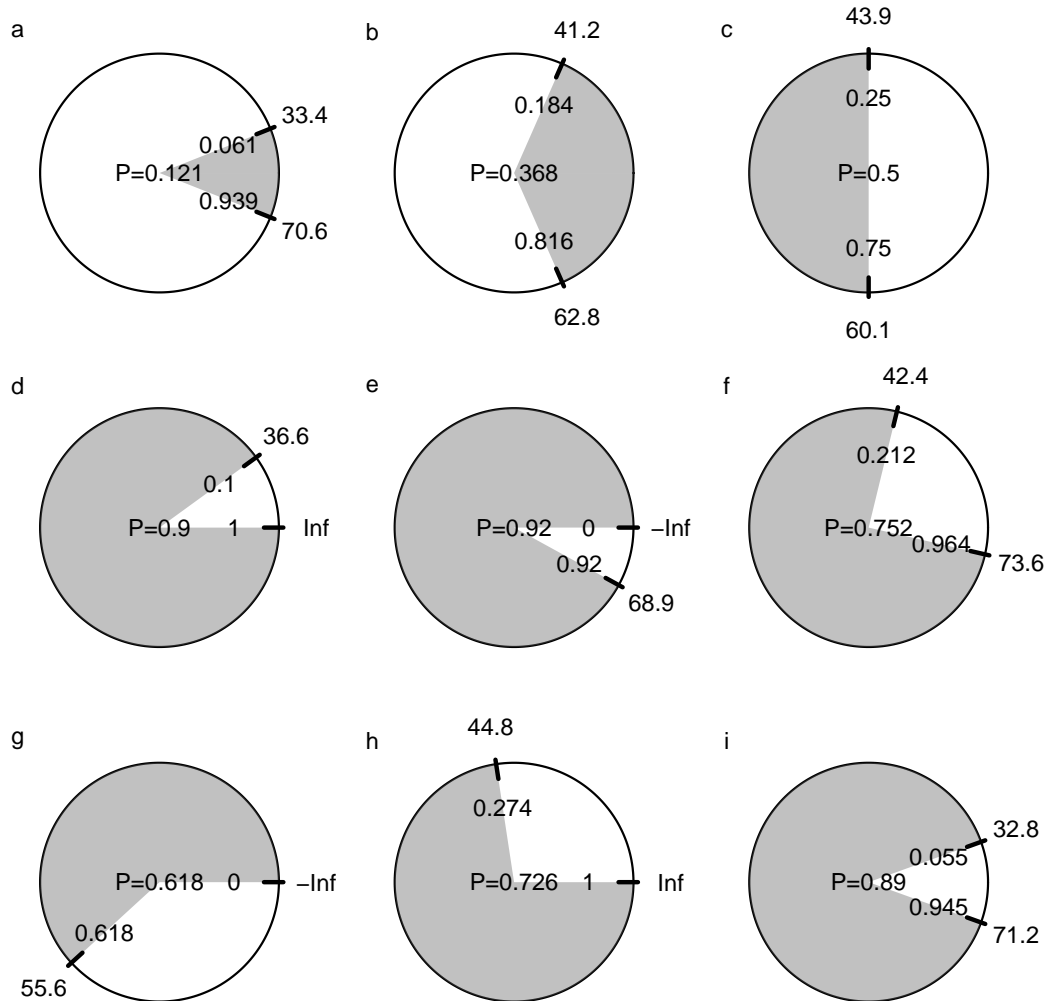
$$X \sim \mathcal{N}(52, 12)$$

The inner distribution ( $U$ ) is the standard uniform distribution.



- Determine  $a$  such that  $P(|X - 52| > a) = 0.12$
- Evaluate  $P(|X - 52| > 10.8)$
- Determine  $a$  such that  $P(|X - 52| < a) = 0.5$
- Determine  $x$  such that  $P(X > x) = 0.9$
- Determine  $x$  such that  $P(X < x) = 0.92$
- Evaluate  $P(42.4 < X < 73.6)$
- Evaluate  $P(X < 55.6)$
- Evaluate  $P(X > 44.8)$
- Evaluate  $P(|X - 52| < 19.2)$

**Solution:** The following circles are meant to help visualize how to get the answers.



(a)  $a = 18.6$

(b)  $P(|X - 52| > 10.8) = 0.368$

(c)  $a = 8.04$

(d)  $x = 36.6$

(e)  $x = 68.9$

(f)  $P(42.4 < X < 73.6) = 0.752$

(g)  $P(X < 55.6) = 0.618$

(h)  $P(X > 44.8) = 0.726$

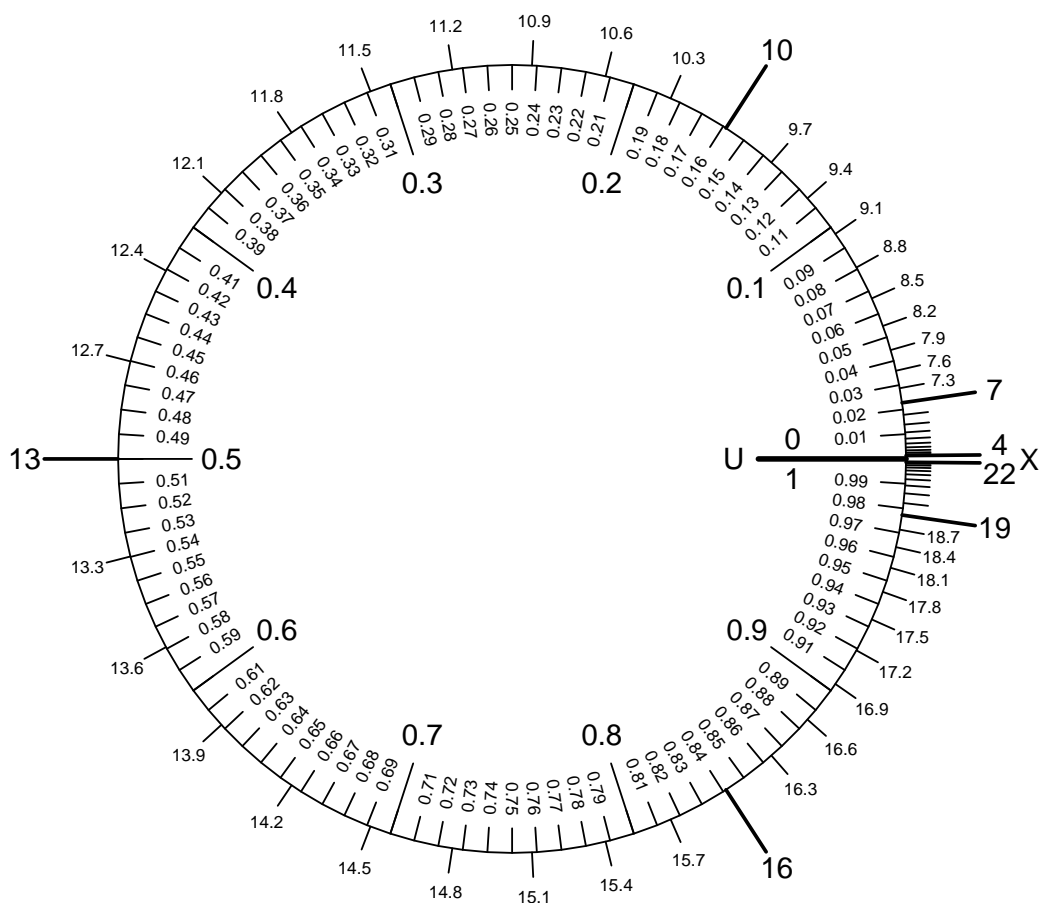
(i)  $P(|X - 52| < 19.2) = 0.89$

**4. Problem:**

The spinner below has two distributions. The outer distribution ( $X$ ) is a normal distribution with mean  $\mu = 13$  and standard deviation  $\sigma = 3$ .

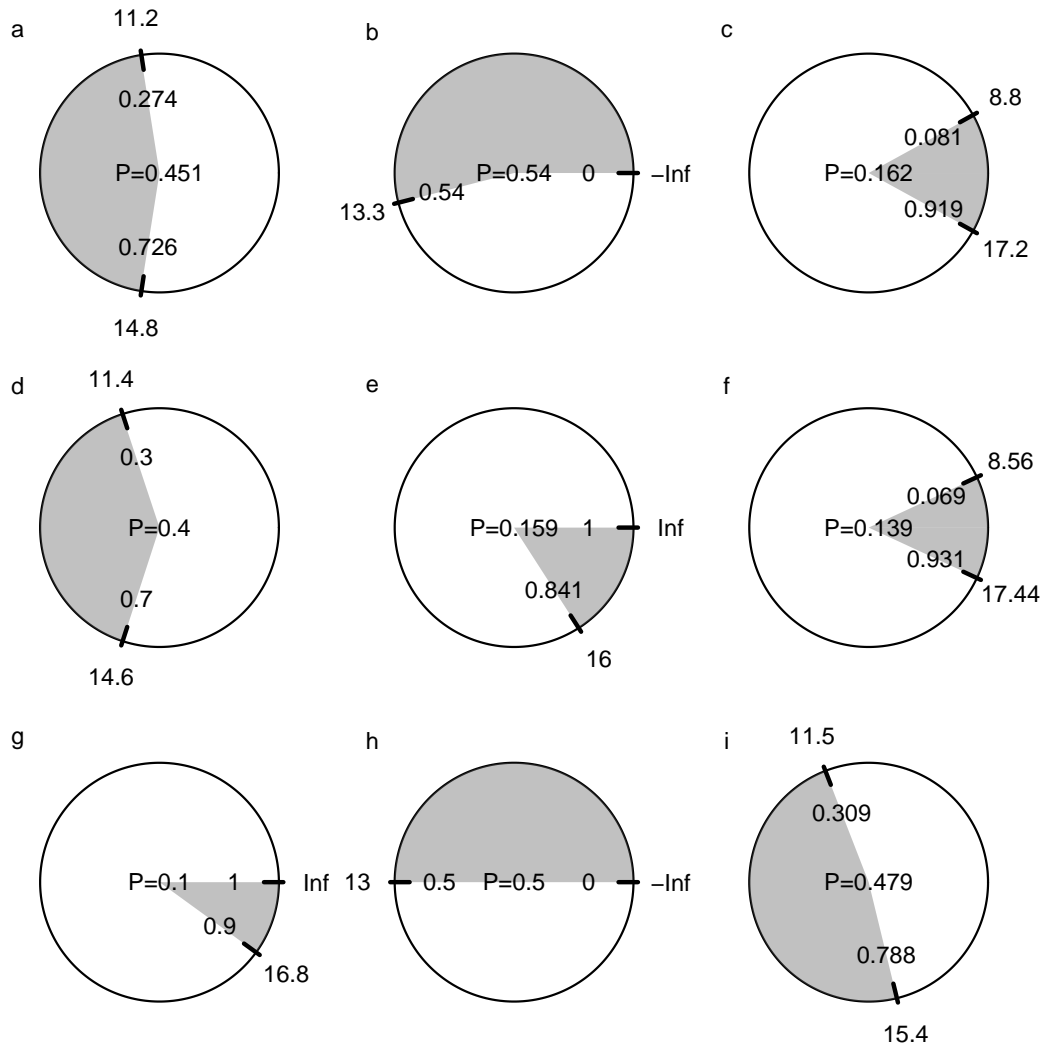
$$X \sim \mathcal{N}(13, 3)$$

The inner distribution ( $U$ ) is the standard uniform distribution.



- Evaluate  $P(|X - 13| < 1.8)$
- Determine  $x$  such that  $P(X < x) = 0.54$
- Evaluate  $P(|X - 13| > 4.2)$
- Determine  $a$  such that  $P(|X - 13| < a) = 0.4$
- Evaluate  $P(X > 16)$
- Determine  $a$  such that  $P(|X - 13| > a) = 0.14$
- Determine  $x$  such that  $P(X > x) = 0.1$
- Evaluate  $P(X < 13)$
- Evaluate  $P(11.5 < X < 15.4)$

**Solution:** The following circles are meant to help visualize how to get the answers.



(a)  $P(|X - 13| < 1.8) = 0.451$

(b)  $x = 13.3$

(c)  $P(|X - 13| > 4.2) = 0.162$

(d)  $a = 1.56$

(e)  $P(X > 16) = 0.159$

(f)  $a = 4.44$

(g)  $x = 16.8$

(h)  $P(X < 13) = 0.5$

(i)  $P(11.5 < X < 15.4) = 0.479$

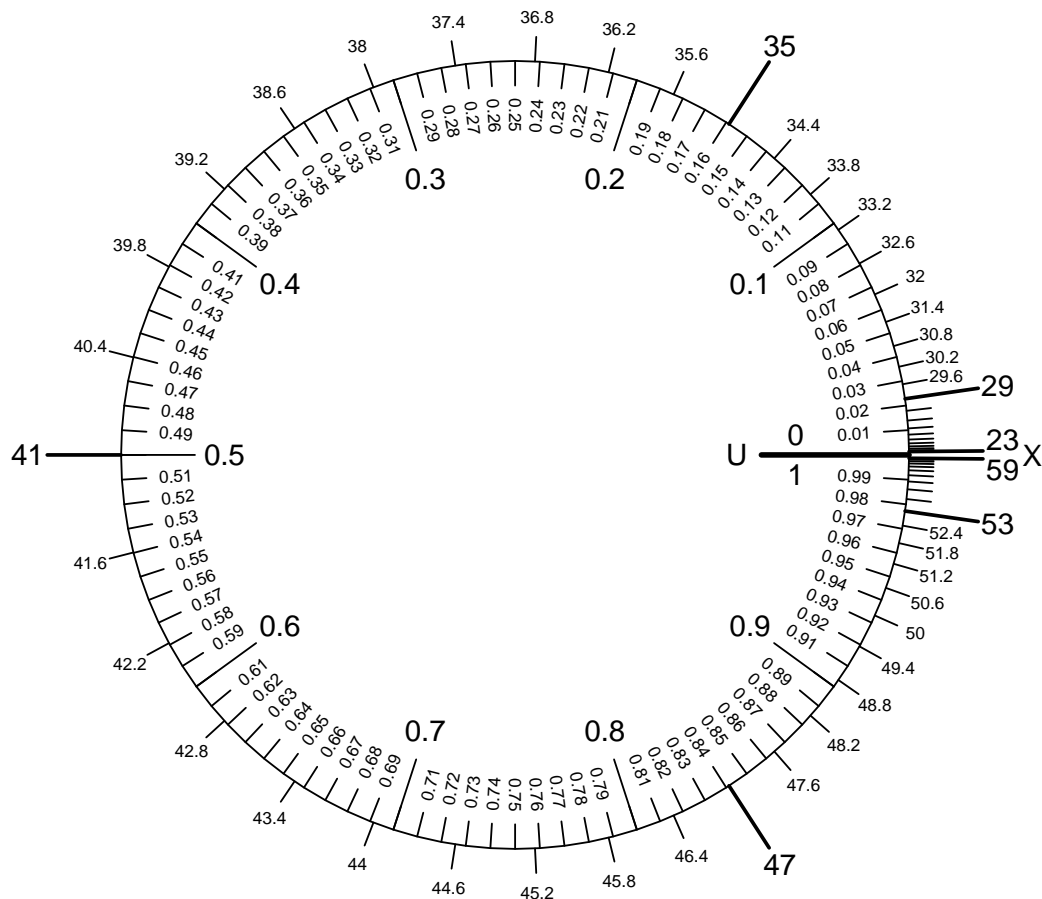


**5. Problem:**

The spinner below has two distributions. The outer distribution ( $X$ ) is a normal distribution with mean  $\mu = 41$  and standard deviation  $\sigma = 6$ .

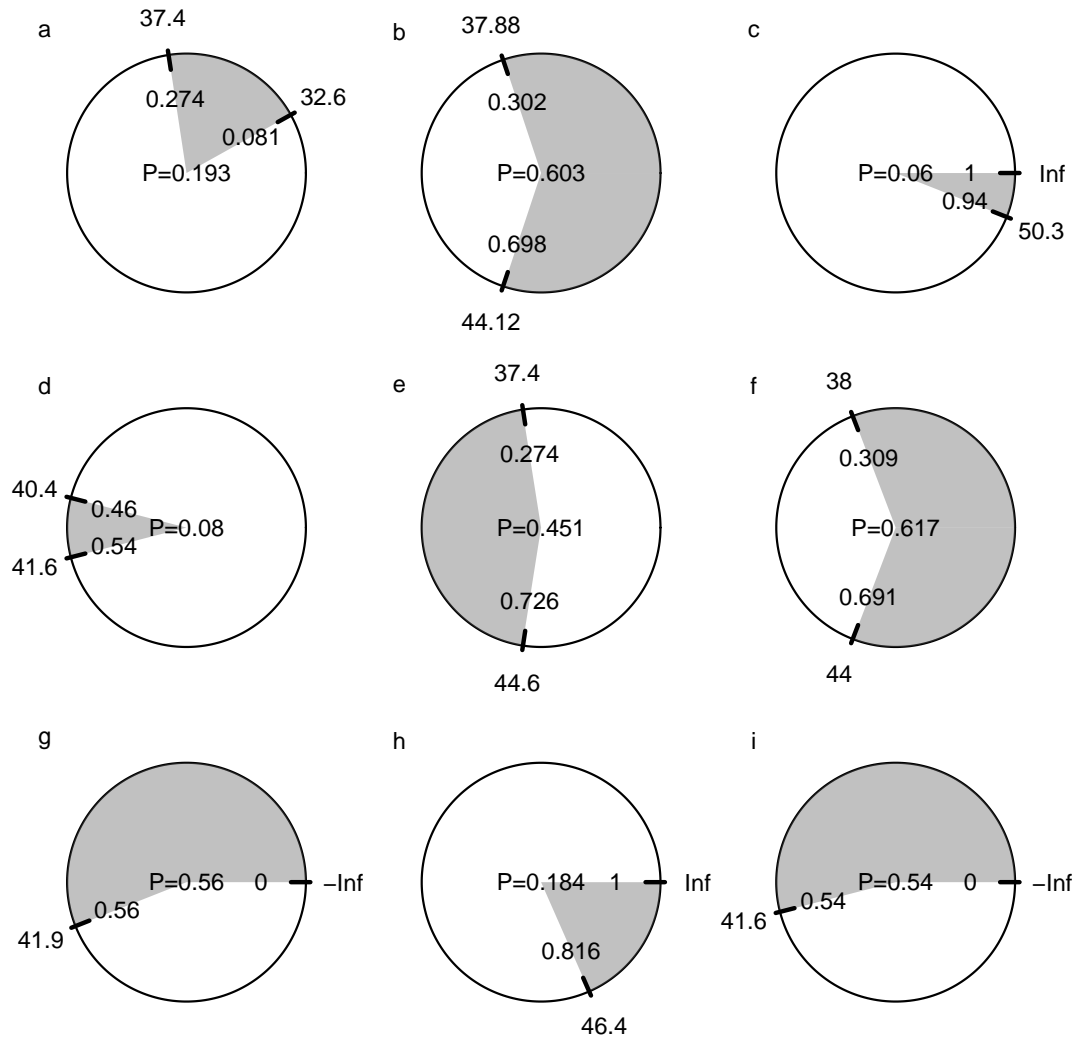
$$X \sim \mathcal{N}(41, 6)$$

The inner distribution ( $U$ ) is the standard uniform distribution.



- Evaluate  $P(32.6 < X < 37.4)$
- Determine  $a$  such that  $P(|X - 41| > a) = 0.6$
- Determine  $x$  such that  $P(X > x) = 0.06000000000000001$
- Determine  $a$  such that  $P(|X - 41| < a) = 0.08$
- Evaluate  $P(|X - 41| < 3.6)$
- Evaluate  $P(|X - 41| > 3)$
- Determine  $x$  such that  $P(X < x) = 0.56$
- Evaluate  $P(X > 46.4)$
- Evaluate  $P(X < 41.6)$

**Solution:** The following circles are meant to help visualize how to get the answers.



(a)  $P(32.6 < X < 37.4) = 0.193$

(b)  $a = 3.12$

(c)  $x = 50.3$

(d)  $a = 0.6$

(e)  $P(|X - 41| < 3.6) = 0.451$

(f)  $P(|X - 41| > 3) = 0.617$

(g)  $x = 41.9$

(h)  $P(X > 46.4) = 0.184$

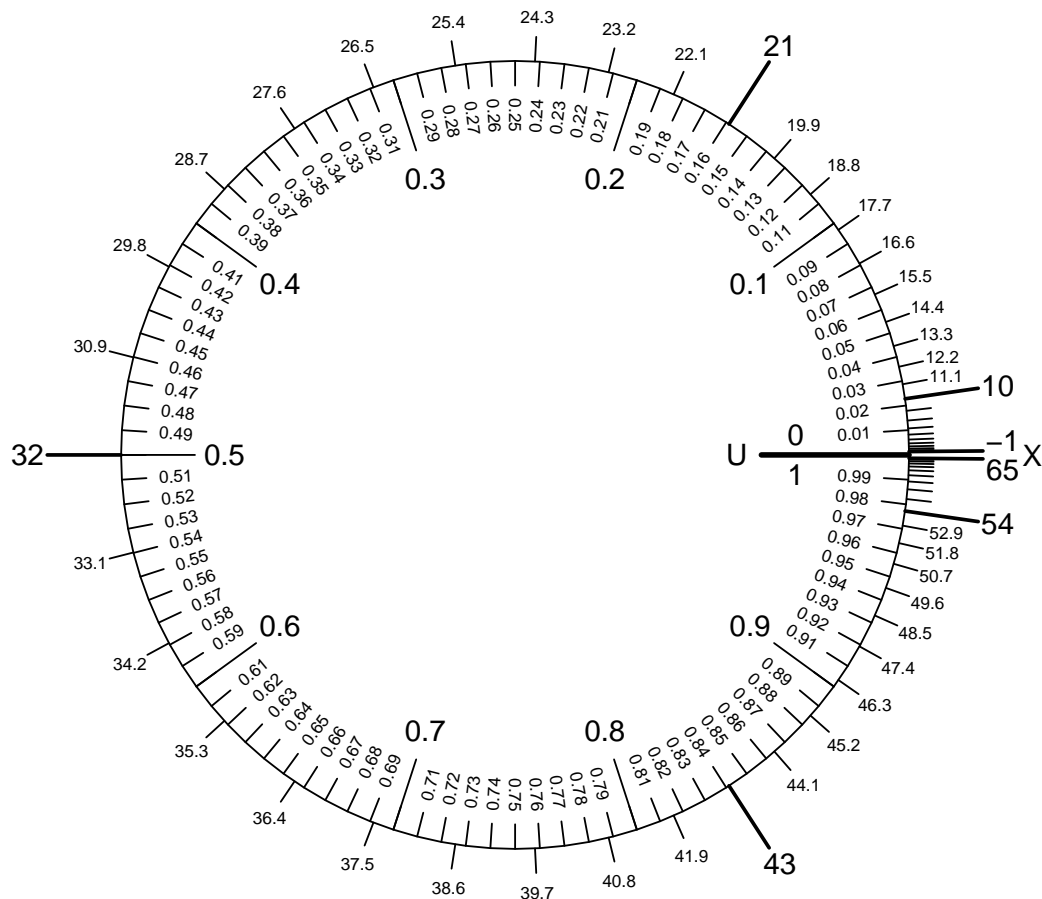
(i)  $P(X < 41.6) = 0.54$

**6. Problem:**

The spinner below has two distributions. The outer distribution ( $X$ ) is a normal distribution with mean  $\mu = 32$  and standard deviation  $\sigma = 11$ .

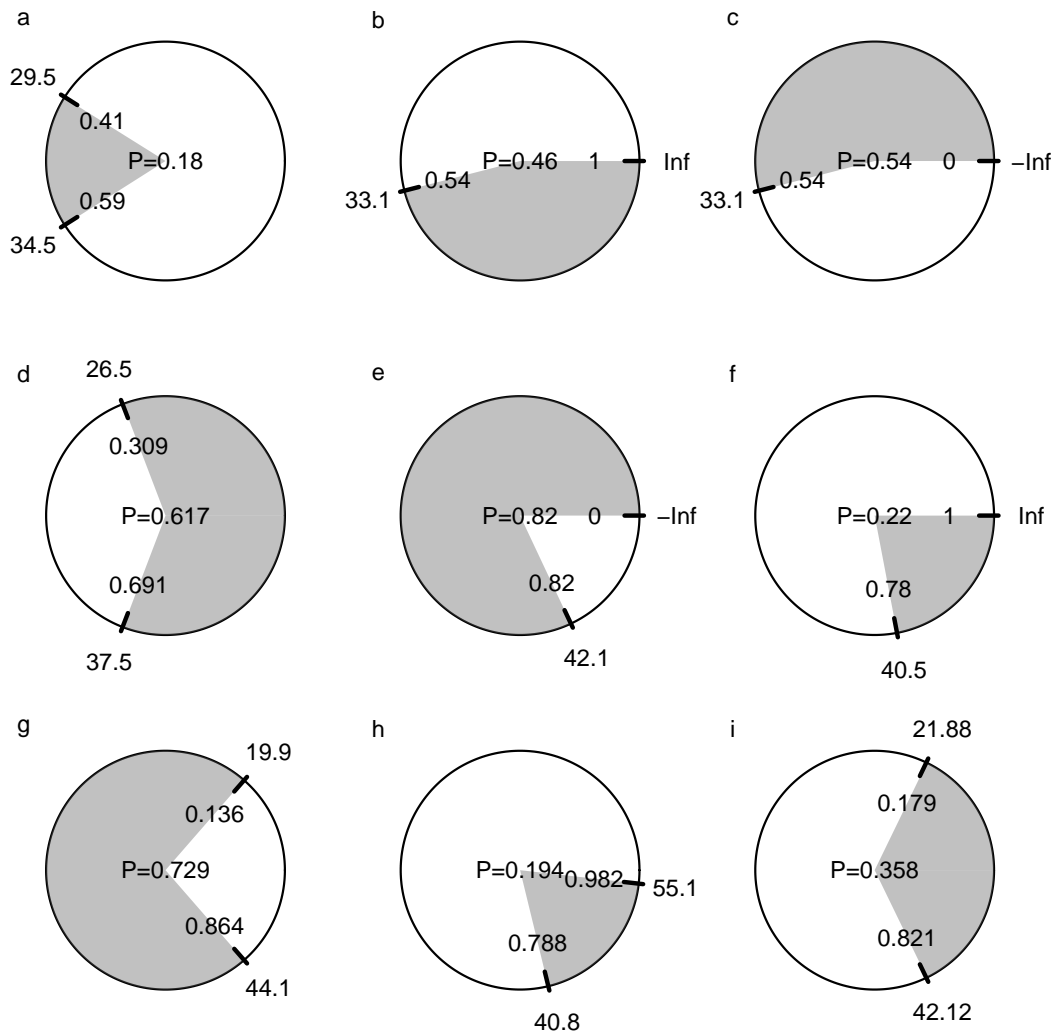
$$X \sim \mathcal{N}(32, 11)$$

The inner distribution ( $U$ ) is the standard uniform distribution.



- Determine  $a$  such that  $P(|X - 32| < a) = 0.18$
- Evaluate  $P(X > 33.1)$
- Evaluate  $P(X < 33.1)$
- Evaluate  $P(|X - 32| > 5.5)$
- Determine  $x$  such that  $P(X < x) = 0.82$
- Determine  $x$  such that  $P(X > x) = 0.22$
- Evaluate  $P(|X - 32| < 12.1)$
- Evaluate  $P(40.8 < X < 55.1)$
- Determine  $a$  such that  $P(|X - 32| > a) = 0.36$

**Solution:** The following circles are meant to help visualize how to get the answers.



(a)  $a = 2.53$

(b)  $P(X > 33.1) = 0.46$

(c)  $P(X < 33.1) = 0.54$

(d)  $P(|X - 32| > 5.5) = 0.617$

(e)  $x = 42.1$

(f)  $x = 40.5$

(g)  $P(|X - 32| < 12.1) = 0.729$

(h)  $P(40.8 < X < 55.1) = 0.194$

(i)  $a = 10.12$