

### Exercise 7C

1 a  $P(Z < a) = 0.3336$

$$P(Z > a) = 0.3336$$

$$\begin{aligned} \text{So } P(Z < a) &= 1 - 0.3336 \\ &= 0.6664 \end{aligned}$$

$$a = 0.43$$

But since  $P(Z < a) < 0.5$ ,  $a$  is negative, therefore

$$a = -0.43$$

b  $P(Z > a) = 0.6879$

$$P(Z < a) = 0.6879$$

$$a = 0.49$$

Since  $P(Z > a) > 0.5$ ,  $a$  is negative.

$$a = -0.49$$

c  $P(Z > a) = 0.1112$

$$P(Z < a) = 0.8888$$

$$a = 1.22$$

d  $P(-a < Z < a) = 0.5820$

$$\begin{aligned} P(Z < a) &= 0.5 + 0.5 \times 0.5820 \\ &= 0.791 \end{aligned}$$

$$a = 0.81$$

2 Use the inverse normal distribution function on your calculator, with  $\mu = 0$  and  $\sigma = 1$ .

a  $P(Z < a) = 0.9082 \Rightarrow a = 1.32975\dots = 1.3298$  (4 d.p.)

b  $P(Z > a) = 0.0314$

$$\Rightarrow P(Z < a) = 0.9686$$

$$\Rightarrow a = 1.86060\dots = 1.8606$$
 (4 d.p.)

c  $P(Z > a) = 0.15$

$$\Rightarrow P(Z < a) = 0.85$$

$$\Rightarrow a = 1.03643\dots = 1.0364$$
 (4 d.p.)

(Alternatively, use the table of percentage points with  $p = 0.15 \Rightarrow a = 1.0364$ )

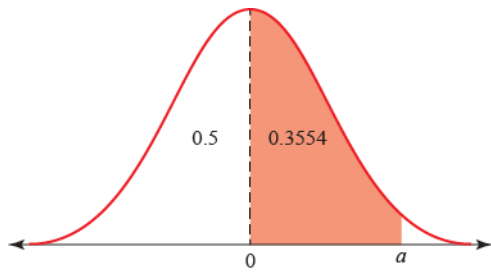
d  $P(Z > a) = 0.95$

$$\Rightarrow P(Z < a) = 0.05$$

$$\Rightarrow a = -1.64485\dots = -1.6449$$
 (4 d.p.)

(Alternatively, use the table of percentage points with  $p = 0.05 \Rightarrow -a = 1.6449 \Rightarrow a = -1.6449$ )

2 e

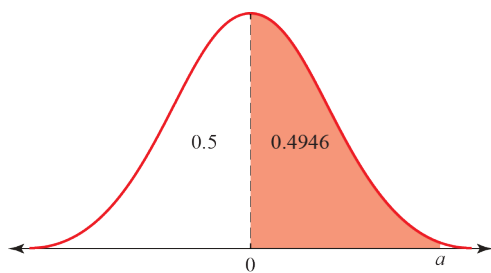


$$P(0 < Z < a) = 0.3554$$

$$\Rightarrow P(Z < a) = 0.8554$$

$$\Rightarrow a = 1.05987\dots = 1.1599 \text{ (4 d.p.)}$$

f

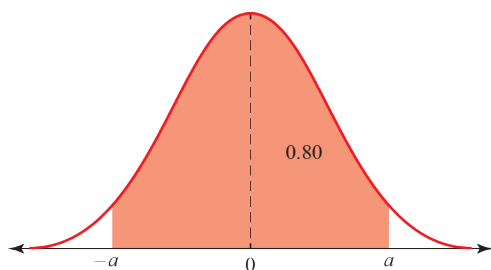


$$P(0 < Z < a) = 0.4946$$

$$\Rightarrow P(Z < a) = 0.9946$$

$$\Rightarrow a = 2.54910\dots = 2.5491 \text{ (4 d.p.)}$$

g



$$P(-a < Z < a) = 0.80$$

$$\Rightarrow P(-a < Z < 0) = 0.40$$

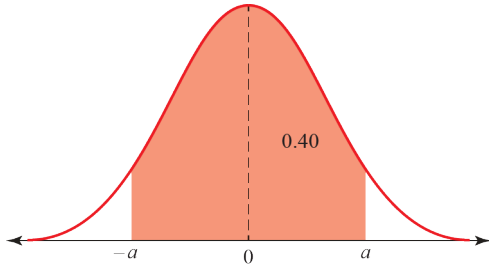
$$\Rightarrow P(-a < Z) = 0.10$$

$$\Rightarrow -a = -1.28155\dots$$

$$\Rightarrow a = 1.2816 \text{ (4 d.p.)}$$

(Alternatively, use the table of percentage points with  $p = 0.10 \Rightarrow a = 1.2816$ )

2 h



$$P(-a < Z < a) = 0.40$$

$$\Rightarrow P(-a < Z < 0) = 0.20$$

$$\Rightarrow P(-a < Z) = 0.30$$

$$\Rightarrow -a = -0.52440\dots$$

$$\Rightarrow a = 0.5244 \text{ (4 d.p.)}$$

(Alternatively, use the table of percentage points with  $p = 0.30 \Rightarrow a = 0.5244$ )