#1 (a) $\frac{1}{k} + \frac{2}{k} = \frac{1}{2}$

$$\frac{3}{k} = \frac{1}{2}$$

$$\boxed{k = 6}$$

	-2	-1	0	1	2
	0.3	$\frac{1}{6}$	$\frac{1}{3}$	0.1	0.1

$$E(X) = (0.3)(-2) + \left(\frac{1}{6}\right)(-1) + \cancel{\left(\frac{1}{3}\right)(0)}$$

$$+(0.1)(1) + (0.1)(2) =$$

$$= -0.6 - \frac{1}{6} + 0.1 + 0.2$$

$$= -\frac{3}{10} - \frac{1}{6}$$

$$= \frac{-9}{30} - \frac{5}{30} = \frac{-14}{30} = \frac{-7}{15}$$

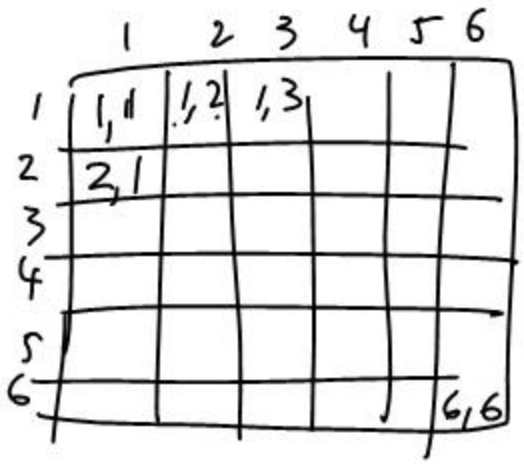
#3

	1	2	3	4
	$\frac{1}{4}$	$\frac{1}{4}$	$\frac{1}{8}$	$\frac{3}{8}$

$$P(3,3) + P(2,4) + P(4,2)$$

$$= \frac{1}{8} \cdot \frac{1}{8} + \frac{1}{4} \cdot \frac{3}{8} + \frac{3}{8} \cdot \frac{1}{4}$$

$$= \frac{1}{64} + \frac{6}{64} + \frac{6}{64} = \frac{13}{64}$$



#4 P could be 2, 4, 8, 6, 12, 16
② ④ ④ ② ② ②

P	2	4	6	8	12	16
	$\frac{1}{8}$ $\frac{2}{16}$	$\frac{2}{8}$ $\frac{4}{16}$	$\frac{1}{8}$ $\frac{2}{16}$	$\frac{2}{8}$ $\frac{4}{16}$	$\frac{1}{8}$ $\frac{2}{16}$	$\frac{1}{8}$ $\frac{2}{16}$

$$E(X) = \frac{1}{8}(2) + \frac{2}{8}(4) + \frac{1}{8}(6) + \frac{2}{8}(8) + \frac{1}{8}(12) + \frac{1}{8}(16)$$

$$E(X) = \mu = \frac{60}{8} = 7\frac{1}{2}$$

$$8\overline{)60} \quad 7\ 4/8$$
$$-56$$
$$4$$

(d) $\frac{1}{4}(10) + \frac{3}{4}(5) = \frac{25}{4} = 6\frac{1}{4}$

£6.25

over 10 weeks: £62.50

#5 X = number of listens

$X \sim B(5, 1/3)$

$$P(X=3) = \binom{5}{3}\left(\frac{1}{3}\right)^3\left(\frac{2}{3}\right)^2$$

$$\binom{5}{3} = \frac{5!}{3!\ 2!} = \frac{5 \cdot 4 \cdot 3 \cdot 2}{3 \cdot 2 \cdot 2} = 10$$

$$P(X=3) = 10 \cdot \frac{4}{3^5} = \frac{40}{243}$$

#6.

X	0	1	2
	0.81	0.18	0.01

$E(X) = (0.18)(1) + (0.01)(2)$

$E(X) = 0.2$

$E(X) = np$

$= 2(0.1)$

$= 0.2$

$P(X=0) = \binom{2}{0}(0.1)^0(0.9)^2 = 0.81$

$P(X=1) = \binom{2}{1}(0.1)^1(0.9)^1 = 0.18$

p. 553 #7

15th percentile

$P(X < 30) = 0.15$

$z = \text{invnorm}(0.15) = -1.036$

$$z = \frac{x - \mu}{\sigma}$$

$$-1.036 = \frac{30 - \mu}{\sigma}$$

$$-1.036\sigma = 30 - \mu$$

$$\mu - 1.036\sigma = 30$$

$P(X > 50) = 0.10$

$z = \text{invnorm}(0.9)$

$= 1.282$

$$1.282 = \frac{50 - \mu}{\sigma}$$

$$\mu + 1.282\sigma = 50$$

subtract

$\mu + 1.282\sigma = 50$

$-2.318\sigma = -20$

$\sigma = 8.628$

$\sigma = 8.63$

$\mu + 1.282(8.628) = 50$

$\mu = 38.9$

#6 $P(X < 80) = 0.85$

$z = \text{invNorm}(.85) = 1.036$

$z = \frac{x-\mu}{\sigma}$

$1.036 = \frac{80 - 71}{\sigma}$

$1.036\sigma = 80 - 71$

$\sigma = \frac{80-71}{1.036} = \underline{8.68}$

(b) $P(X \geq 65)$ $\quad X \sim N(71, 8.68^2)$

$z = \frac{65-71}{8.68} = \underline{-0.691}$

$P(X \geq 65) = P(z \geq -0.691)$

$= \text{normalcdf}(-0.691, 9) = \underline{0.755}$