TG 8 It is given that 40% of voters support the Stats Party. One hundred and fifty voters are selected at random. Use a suitable approximation to find the probability that more than 55 of the 150 voters support the Stats Party. Projectmaths has provided this probability table extract:

z	.00	.01	.02	.03	.04	.05	.06	.07	.08	.09
0.5	.6915	.6950	.6985	.7019	.7054	.7088	.7123	.7157	.7190	.7224
0.6	.7257	.7291	.7324	.7357	.7389	.7422	.7454	.7486	.7517	.7549
0.7	.7580	.7611	.7642	.7673	.7704	.7734	.7764	.7794	.7823	.7852
0.8	.7881	.7910	.7939	.7967	.7995	.8023	.8051	.8078	.8106	.8133
0.9	.8159	.8186	.8212	.8238	.8264	.8289	.8315	.8340	.8365	.8389

$n = 150$

$P(\text{support}) = p = 0.4$

$np = 150(0.4) = 60$

As $np \geq 10$, then use normal distribution:

$\mu_{\hat{p}} = p = 0.4$

$$\sigma_{\hat{p}} = \sqrt{\frac{p(1-p)}{n}}$$

$$= \sqrt{\frac{0.4(1-0.4)}{150}}$$

$$= 0.04$$

Now, 55 out of 150 is 0.3667. (4 dec pl)

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

$$= \frac{0.3667-0.4}{0.04}$$

$$= -0.83 \text{ (2 dec pl)}$$

For $z = 0.83$, the table provides 0.7967.

Hence, for $z = -0.83$, the table would show 0.2033.

As 1 – 0.2033 is 0.7967, the probability is 0.7967.