(Note: The same setup is used for all three problems.)
If X and Y are independent random variables, with X uniform on $[-1, 2]$ and Y uniform on $[-1, 1]$, then what is the probability that Y is less than the absolute value of X ?

(a) $5/6$

(b) $1/6$

(c) $1/4$

(d) $1/3$

(e) $1/2$

(f) $2/3$

(g) $5/12$

(h) $1/12$

(i) $7/12$

(j) $1/\sqrt{2}$

(k) $1/(2\sqrt{2})$

(l) None of these

If X and Y are independent random variables, with X uniform on $[-1, 2]$ and Y uniform on $[-1, 1]$, then what is the probability that $2X - 3 < Y < 2X + 1$?

(a) 2/3

(b) 1/9

(c) 1/18

(d) 1/3

(e) 2/9

(f) 4/9

(g) 5/9

(h) 7/9

(i) 1/6

(j) 3/4

(k) 5/6

(l) None of these

If X and Y are independent random variables, with X uniform on $[-1, 2]$ and Y uniform on $[-1, 1]$, then what is the probability that $Y + 1$ is less than X^2?

(a) $\frac{13-4\sqrt{2}}{18}$

(b) $1 - \frac{4\sqrt{2}}{18}$

(c) $\frac{4\sqrt{2}}{18}$

(d) $1 - \frac{2\sqrt{2}}{18}$

(e) $\frac{2\sqrt{2}}{18}$

(f) $\frac{13}{18}$

(g) $\frac{2}{9}$

(h) $1 - \frac{4\sqrt{2}}{9}$

(i) $\frac{4\sqrt{2}}{9}$

(j) $\frac{4}{9}$

(k) $1 - \frac{\sqrt{2}}{9}$

(l) None of these