(Note: The same setup is used for all three problems on this quiz.)
Suppose a box contains one banana, two apples, three grapes, and four melons. You reach into the box and pick one piece of fruit, each piece being equally likely. What is the probability the single piece of fruit you pick is an apple or a grape, and also a banana or a grape?

(a) 3/10

(b) 1/10

(c) 1/5

(d) 2/5

(e) 5/10

(f) 3/5

(g) 7/10

(h) 4/5

(i) 9/10

(j) 1/3

(k) 1

(l) None of these

$S = \{b, a, a, g, g, g, m, m, m, m\}, \; |S| = 10$

$E = a \cup g = \{a, a, g, g, g\}$

$F = b \cup g = \{b, g, g, g\}$

$P(E) \wedge P(F) = \frac{3}{10}$

Suppose a box contains one banana, two apples, three grapes, and four melons. You reach into the box and pick one piece of fruit, each piece being equally likely. What is the probability the single piece of fruit you pick is a melon or an apple, given it is a grape or an apple?

(a) 2/5

(b) 3/5

(c) 1/5

(d) 4/5

(e) 1/10

(f) 3/10

(g) 1/2

(h) 1/3

(i) 7/10

(j) 9/10

(k) 2/3

(l) None of these

$$S = \{b, a, a, g, g, g, m, m, m, m\}, \quad |S| = 10$$

$$E = m \cup a = \{m, m, m, m, a, a\}$$

$$F = g \cup a = \{g, g, g, a, a\}$$

$$P(E|F) = \frac{P(EF)}{P(F)} = \frac{\frac{2}{10}}{\frac{5}{10}} = \boxed{\frac{2}{5}}$$

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Suppose a box contains one banana, two apples, three grapes, and four melons. You reach into the box and pick one piece of fruit, each piece being equally likely. What is the probability the single piece of fruit you pick is a grape or not an apple, given it is a melon or not a banana?

(a) 7/9

(b) 2/9

(c) 1/9

(d) 8/9

(e) 1/3

(f) 7/10

(g) 5/7

(h) 1/2

(i) 2/5

(j) 3/5

(k) 2/3

(l) None of these

$$S = \{b, a, a, g, g, g, m, m, m, m\}, \quad |S| = 10$$

$$E = g \cup a^c = \{b, g, g, g, m, m, m, m\}$$

$$F = m \cup b^c = \{a, a, g, g, g, m, m, m, m\}$$

$$P(E|F) = \frac{P(EF)}{P(F)} = \frac{\frac{7}{10}}{\frac{9}{10}} = \boxed{\frac{7}{9}}$$