

Finite Mathematics (Math 10120), Spring 2017

Quiz 5, Wednesday April 12

Solutions

1. (5 pts) The weight of honeycrisp apples grown by Minnesota Orchards is normally distributed with a mean of 15.25 ounces and a standard deviation of 2.5 ounces. Which answer below gives the probability that a randomly chosen honeycrisp apple from Minnesota Orchards will weigh between 14 and 19 ounces? (Recall that Z is the random variable associated to the standard normal curve, with mean 0 and standard deviation 1.)

- (a) $\mathbf{P}(0.5 \leq Z \leq 1.5)$
- (b) $\mathbf{P}(-1.25 \leq Z \leq 3.75)$
- (c) $\mathbf{P}(14 \leq Z \leq 19)$
- (d) $\mathbf{P}(-0.5 \leq Z \leq 1.5)$
- (e) $\mathbf{P}(1.25 \leq Z \leq 3.75)$

Solution: Let X denote the random variable giving the weight of a honeycrisp apple. Then X has mean $\mu = 15.25$ and standard deviation $\sigma = 2.5$. The question is asking for $\mathbf{P}(14 \leq X \leq 19)$ (which is *not* the same as answer (c), since (c) is talking about the standard normal Z). To use the standard normal Z , find the associated z -scores:

$$\begin{aligned}\mathbf{P}(14 \leq X \leq 19) &= \mathbf{P}\left(\frac{14 - \mu}{\sigma} \leq Z \leq \frac{19 - \mu}{\sigma}\right) \\ &= \mathbf{P}\left(\frac{14 - 15.25}{2.5} \leq Z \leq \frac{19 - 15.25}{2.5}\right) = \mathbf{P}(-0.5 \leq Z \leq 1.5)\end{aligned}$$

So the answer is (d).

2. (5 pts) Sketch a graph of the feasible set satisfying the following constraints:

$$3x + y \leq 9$$

$$-x + y \geq 1$$

$$x \geq 0$$

$$y \geq 0$$

Solution: The graph is below. A possible test point to verify the feasible set is (1, 3).

