Homework due April 8

Assigned exercises:
From linked supplement: 7, 8, 17, 20, 25, 28, 33, 40(a-d).
From Ch.6, OpenStax: ex. 63, 68, 74, 75, 79, 80, 88. (total=15 exercise numbers)

Graded exercises:
From linked supplement: 8, 33, 40.
From Ch.6, OpenStax book: 75, 88.

Total (maximum) possible points = 20.
3 pt for each of 5 graded problems, plus 5 for completion of the rest.
−0.5 pt for each (ungraded) missing problem; if a graded problem is missing, student loses the points allotted to it.

Exercises from linked supplement

(8) Given: Soccer team scores on 8% of their corner kicks.

The next 15 kicks can be considered a binomial experiment if we assume the kicks are independent and have the same probability of scoring. Under those assumptions, the model is: $B(15, 0.08)$.

Probability of scoring on exactly 2 out those 15 kicks $= {}_{15}C_2\ (0.08)^2\ (0.92)^{13}$

$$\boxed{= 0.227}$$

> **Grade**:
> 2 pt = write/show the probability as ${}_{15}C_2\ (0.08)^2\ (0.92)^{13}$
> 1 pt = show even some minimal step or reason.

(33) Let X = random variable that represents Mary's gain (in \$).

(a) The probability that $X = \$100$ is 0.8.
And the probability that $X = -\$150$ is 0.2.
Thus, the expected value is: $\sum x \cdot P(x) = (100)(0.8) - (150)(0.2)\ \boxed{= \$50}$

(b) The standard deviation is: $\sqrt{\sum (x - \bar{x})^2\ \mathrm{P}(x)}$, with $\bar{x} = \$50$.

$$= \sqrt{(100 - 50)^2 \cdot (0.8) + (-150 - 50)^2 \cdot (0.2)}$$

$$\boxed{= \$100}\ \text{(Answer)}$$

> **Grade**: 1.5 pt. each for (a) and (b).
> For each: 1 pt = show correct calculation step(s); 0.5pt = get correct answer.

(40) (a) Not graded, but here are the answers: Mean = 60, SD = 12.

(b) Mean: $E(0.5Y) = 0.5 \cdot E(Y) = (0.5)(12)\ \boxed{= 6}$ (Answer)
$SD(0.5Y) = 0.5 \cdot SD(Y) = (0.5)(3)\ \boxed{= 1.5}$ (Answer)

(c) Mean: $E(X+Y) = E(X) + E(Y) = 10 + 20 \boxed{= 30}$ (Answer)

$$SD(X+Y) = \sqrt{\text{VAR}(X+Y)} = \sqrt{\text{VAR}(X) + \text{VAR}(Y)} = \sqrt{12^2 + 3^2}$$

$$\boxed{\approx 12.37} \text{ (Answer)}$$

(d) Not graded, but here are the answers:

$E(X-Y) = 68, \quad SD(X-Y) = SD(X+Y) \approx 12.37$

Grade: 1.5 pt each for (b) and (c). (a) and (d) are not graded.
For each: 0.5pt for correct mean + 0.5pt for correct SD + 0.5pt show some step(s).

Exercises from Ch.6, OpenStax

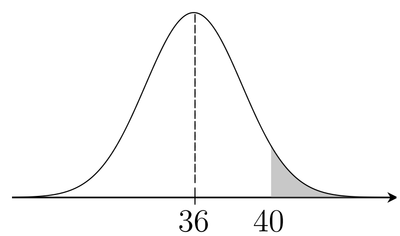
(75) (a) Since X is normally distributed with mean=36 and SD=10: $\boxed{X \sim N(36, 10)}$

(b) To find the probability that $X > 40$:

$$z = \frac{40 - 36}{10} = 0.4.$$

From z-table, $P(z > 0.4) = 0.3446$

Answer: The probability that a person consumes more than 40% fat = 0.3446.



(c) The maximum of the lower quarter occurs when there is 25% in the left tail.

From the z-table, this occurs at $z = -0.67$.

The corresponding value of fat % $= -0.67 \times 10 + 36 \boxed{= 29.3\%}$ (Answer)

Grade: (a) is not graded. 1.5pt each for (b) and (c).
For (b): 0.5pt = compute z-score, or show exactly how table lookup was done.
1 pt = get correct answer.
For (c): 0.5pt = find z-score corresponding to 25% in the left tail.
1 pt = get correct answer.
−0.5 point if no sketch is shown. Both (b), (c) asked for sketches. At least one is required for full credit.

(88) Given: On average, 28% of 18 to 34 y.o. Facebook users check their profile in the morning. The SD is 5% and the distribution is normal.

(a) Let X = percent of 18 to 34 y.o. users who check their profile in the mornings.

We have $X \sim N(28, 5)$. The z-score for $X = 30$ is: $z = \dfrac{30 - 28}{5} = 0.4$.

To find $P(X \geq 30)$, lookup $P(z \geq 0.4)$. From z-table, $P(z \geq 0.4) \boxed{= 0.3446}$

(b) From z-table, the 95th percentile occurs at $z = 1.64$.

The corresponding % score $= 1.64 \times 5 + 28 \boxed{= 36.2\%}$ (Answer)

Grade: 1.5pt each for (a) and (b).
For (a): 0.5pt = compute z-score, or show exactly how table lookup was done.
1 pt = get correct answer.
For (b): 0.5pt = find z-score corresponding to 95% in the left tail.
1 pt = get correct answer.