

Exploring One-Variable Data: Shape, Center, Spread

Grade 12 – AP Statistics math · Test Answer Key · Standards: AP Statistics Unit 1 (2026-27)

The scoring guide gives the points for each part of every question. Partial credit is awarded for correct setup, and interpretations must refer to the context.

Standards: AP Statistics Unit 1 (2026-27) · **Level:** Grade 12 AP Statistics

Question 1 Categorical Data (2 points)

(a) Each student falls into a named group, so the variable is categorical. (b) $27/90 = 30\%$.

(a) categorical; (b) 30%

Scoring: 1 point each part.

Question 2 Mean, Median and Shape (2 points)

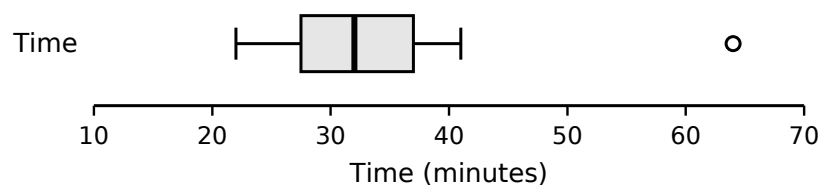
(a) Sum = 80, mean = 8. Median = $(5 + 6)/2 = 5.5$. (b) The distribution is skewed right (the 26 creates a long right tail), so the median, which is resistant, is more appropriate; the mean is pulled above the median.

(a) mean 8, median 5.5; (b) skewed right, use the median

Scoring: 1 point for both values, 1 point for shape with justification.

Question 3 Outliers and Boxplot (3 points)

(a) Min 22, $Q_1 = 27.5$, median = 32, $Q_3 = 37$, max 64. (b) IQR = 9.5, fences 13.25 and 51.25; $64 > 51.25$ so 64 is an outlier. (c) The box runs from 27.5 to 37 with the median line at 32, the upper whisker ends at 41, and 64 is plotted as a separate point.



Modified boxplot.

Five numbers 22, 27.5, 32, 37, 64; outlier: 64

Scoring: 1 point five-number summary, 1 point fences with conclusion, 1 point boxplot.

Question 4 Percentile and Shape (2 points)

(a) 13 players scored fewer than 4 goals: $13/20 = 65\%$. (b) Most values are small, and the tail extends to 11: skewed right.

(a) 65th percentile; (b) skewed right

Scoring: 1 point each part.

Question 5 Comparing Performances (2 points)

Running: $z = (62.4 - 66.0)/3.0 = -1.20$, which is 1.2 standard deviations faster than the mean.
Jumping: $z = (5.05 - 4.60)/0.30 = 1.50$, which is 1.5 standard deviations farther than the mean.
The jump is more unusual in the good direction.

Long jump (1.5 vs 1.2 standard deviations better than the mean)

Scoring: 1 point both z-scores, 1 point comparison that accounts for direction.

Question 6 Comparing Boxplots (3 points)

(a) The West store has the higher median, \$3,000 versus \$2,600. (b) IQR is $42 - 22 = 20$ for West and $31 - 20 = 11$ for East; the ranges are 50 and 33, so West sales vary more. (c) East has the more consistent sales because its IQR and range are smaller.

(a) West median is higher; (b) West has greater spread; (c) East is more consistent

Scoring: 1 point each part, answers must refer to context.

Question 7 Empirical Rule (2 points)

(a) $24 \pm 2(5)$ gives 14 to 34 minutes. (b) $19 = 24 - 5$ is one standard deviation below the mean; 68% lie within 1σ , so 32% lie outside, and 16% lie below.

(a) 14 to 34 minutes; (b) 16%

Scoring: 1 point each part.

Question 8 Normal Calculations (2 points)

(a) $z = (75 - 63)/8.5 = 1.41$; the area above is 0.0790. (b) The 20th percentile has $z = -0.842$, so $x = 63 - 0.842(8.5) = 55.8$ cm.

(a) ≈ 0.079 ; (b) ≈ 55.8 cm

Scoring: 1 point each part.

Question 9 Transforming Scores (2 points)

Adding 6 shifts the center but not the spread; multiplying by 1.25 changes both. New mean = $1.25(52 + 6) = 72.5$, new median = $1.25(54 + 6) = 75.0$, new SD = $1.25(9) = 11.25$.

Mean 72.5, median 75, standard deviation 11.25

Scoring: 1 point for both centers, 1 point for standard deviation with reasoning.