



Fox School of Business
TEMPLE UNIVERSITY®

2019 OWLympiad Sample Questions

Rules:

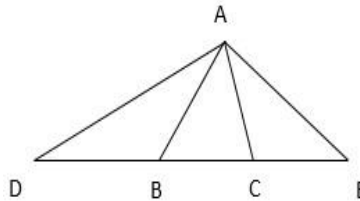
- This is a team exam.
- It is a multiple-choice exam.
- Teams will have 50 minutes to complete the exam.
- No calculators may be used

1. Find the derivative of $f(x) = 10\sqrt[5]{x^3} - \sqrt{x^7} + 6\sqrt[3]{x^8} - 3$, with respect to x .

- A. $6x^{\frac{2}{5}} - \frac{7}{2}x^{\frac{5}{2}} + 16x^{\frac{3}{5}}$
- B. $10x^{\frac{3}{5}} - x^{\frac{7}{2}} + 6x^{\frac{8}{3}} - 3$
- C. $6x^{-\frac{2}{5}} - \frac{7}{2}x^{\frac{5}{2}} + 16x^{\frac{5}{3}}$
- D. $6x^{\frac{2}{5}} - \frac{7}{2}x^{-\frac{5}{2}} + 16x^{\frac{5}{3}}$

2. In $\triangle ABC$, $\angle ABC = 50^\circ$, $\angle ACB = 80^\circ$. $AB = BD$, $AC = CE$. Find $\angle DAE$.

- A. 100°
- B. 105°
- C. 115°
- D. 130°



3. Vandana is giving the weather report. She predicts that there is a 44% chance it will rain on both Monday and Tuesday. Given that it rains on Monday, there is a 72% chance it will rain on Tuesday. What is the probability that it will rain on Monday?

- A. $\frac{1}{6}$
- B. $\frac{7}{8}$
- C. $\frac{11}{18}$
- D. $\frac{13}{18}$

4. Given $\begin{bmatrix} 0 & 3 & 0 \\ 4 & 7 & 5 \\ 12 & 21 & 15 \end{bmatrix} \begin{bmatrix} x \\ y \\ z \end{bmatrix} = \begin{bmatrix} 8 \\ 11 \\ 33 \end{bmatrix}$, solve for x , y and z .

- A. $x = 0$, $y = 7$, $z = 15$
 - B. $x = 8$, $y = 11$, $z = 23$
 - C. No solution
 - D. More than one solution
5. Given that $a + b = 5$ and $ab = 2$, find the exact value of $a^3 + b^3$.

- A. 90
- B. 95
- C. 100
- D. 105

6. A theatre manager is trying to decide which movie genres are best for his theatre, so he looks at the sales data from the past year.

49% saw comedy,
64% saw drama,
43% saw horror,
24% saw both drama and horror,
26% saw both drama and comedy,
13% saw both comedy and horror, and
7% saw all three.

What percentage saw drama exclusively?

- A. 7
B. 13
C. 17
D. 21
7. Simplify: $2 \ln(y) + \frac{\ln x \log_x x}{\ln e - \ln 1}$.

- A. $\ln(xy^2)$
B. $\ln(y^2 + x)$
C. $\ln(y^2) + \log_x x$
D. $\ln(2y + x)$

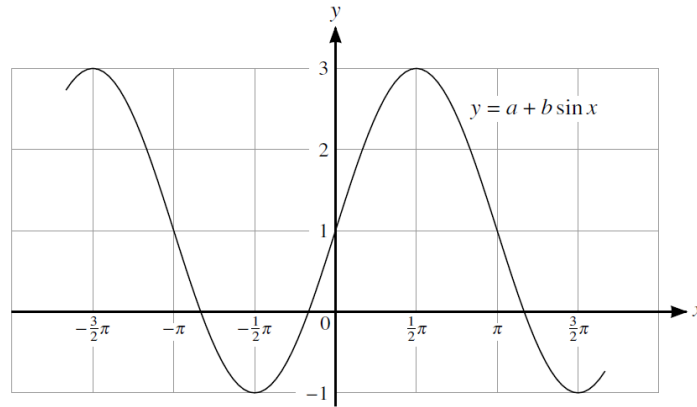
8. $\frac{\sin x}{1 - \sin x} - \frac{\sin x}{1 + \sin x}$ can also be written as:

- A. $\frac{2 \sin x}{1 + \sin x}$ B. $\frac{2 \sin x}{1 - \sin x}$ C. $-2 \tan x$ D. $2 \tan^2 x$

9. Find the line perpendicular to $7x + 11y = 25$ that goes through the point (2, 1).

- A. $y = \frac{11}{7}x + \frac{15}{7}$
B. $y = \frac{7}{11}x - \frac{7}{15}$
C. $y = -\frac{11}{7}x + \frac{15}{7}$
D. $y = \frac{11}{7}x - \frac{15}{7}$

10. (i) From the diagram below, what are the values of a and b ?
(ii) What is the period of the graph of $y = a + b \sin(2x)$, where $a = 0$ and $b = 3$? In what interval does it lie?



- A. $a = 1$ $b = 2$ period: 2π $[-3,3]$ C. $a = -1$ $b = 3$ period: π $[-2,2]$
B. $a = -1$ $b = 3$ period: 2π $[-2,2]$ D. $a = 1$ $b = 2$ period: π $[-3,3]$

11. Which of the following describes the relationship between x and y as shown in the pairs of numbers in the table below?

x	y
3	28
4	65
5	126
6	217
7	344

- A. $y = 9x + 1$ B. $y = x^2 + x^2$ C. $y = x^4 + x^{-1}$ D. $y = x^3 + 1$

12.

X	10	20	25	30	40	45
Y	5	15	20	25	35	40

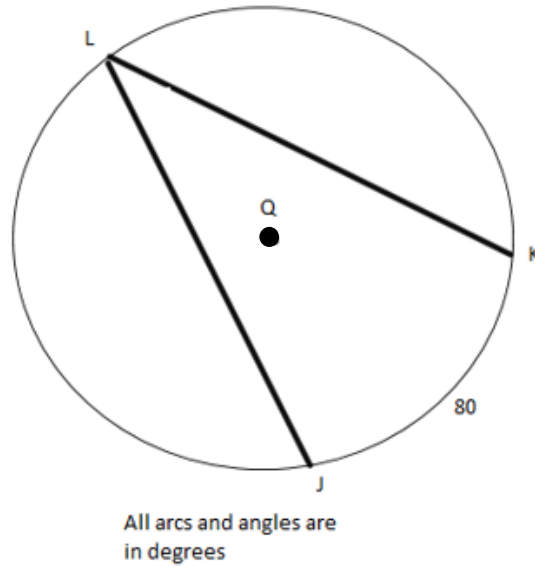
According to the table above, what's the relationship between the mean of X and the mean of Y ? What about variance?

- A. $\text{mean}(X) > \text{mean}(Y)$; $\text{variance}(X) > \text{variance}(Y)$.
B. $\text{mean}(X) = \text{mean}(Y)$; $\text{variance}(X) > \text{variance}(Y)$.
C. $\text{mean}(X) = \text{mean}(Y)$; $\text{variance}(X) = \text{variance}(Y)$.
D. $\text{mean}(X) > \text{mean}(Y)$; $\text{variance}(X) = \text{variance}(Y)$.

13. If the product of 6 integers is negative, at most, how many of the integers can be negative?

- A. 2 B. 3 C. 4 D. 5

14. In circle Q, find the measure of inscribed $\angle JLK$



- A. 20 B. 40 C. 60 D. 80

15. Find the domain for $f(x) = \sqrt{\frac{x^2-5x}{x^2-9}}$

- A. $(\infty,3) \cup (0,3) \cup [5,\infty)$ C. $(-\infty,-3) \cup [0,3) \cup [5,\infty)$
B. $(\infty,-3) \cup [0,3) \cup (5, \infty)$ D. $(-\infty,-3) \cup [0,3) \cup (5,\infty)$