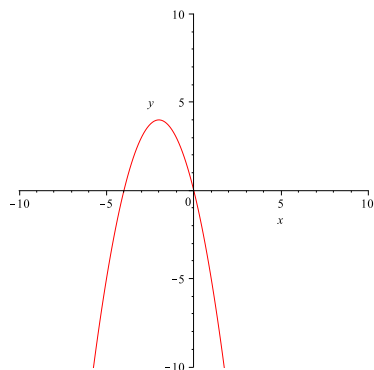


This exam is closed book. No graphing calculators or cell phones are allowed. No bathroom breaks are permitted while taking the exam. Good luck!

1 Multiple Choice (2 points each)

- (1) Fill in the blanks: A horizontal line has a slope of _____ and a vertical line has a slope of _____.
- (A) undefined, 0
(B) 0, undefined
(C) ∞ , undefined
(D) undefined, ∞
- (2) Find the standard form of the equation of the line passing through points (2, -6) and (-9, 6).
- (A) $8x - 15y = -18$
(B) $-8x + 15y = -18$
(C) $12x + 11y = -42$
(D) $-12x + 11y = -42$
- (3) Write an equation for the below graph in vertex form (i.e. $y = a(x - h)^2 + k$, where $h = \frac{-b}{2a}$ and $k = c - \frac{b^2}{4a}$).

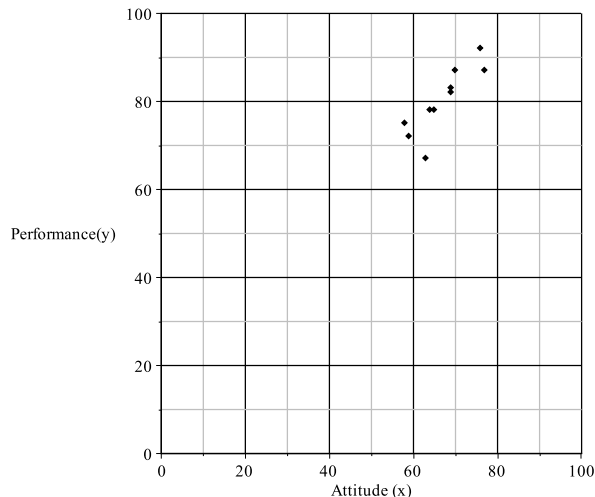


- (A) $y = -(x - 2)^2 - 4$
(B) $y = (x + 2)^2 + 4$
(C) $y = (x + 2)^2 - 2$
(D) $y = -(x + 2)^2 + 4$

- (4) Solve the inequality for x : $-13 \leq -3x + 2 \leq -7$
- (A) $[-5, -3]$
(B) $(-5, -3)$
(C) $[3, 5]$
(D) $(3, 5)$
- (5) Convert to an exponential equation: $\log_9 27 = \frac{3}{2}$
- (A) $27 = \left(\frac{3}{2}\right)^9$
(B) $9 = 27^{\frac{3}{2}}$
(C) $27 = 9^{\frac{3}{2}}$
(D) $\frac{3}{2} = \sqrt[9]{27}$

(6) Employees of some random firm are evaluated according to job performance and attitude. The results for 10 random employees are shown and plotted below.

Attitude (x)	Performance (y)
59	72
63	67
65	78
69	82
58	75
77	87
76	92
69	83
70	87
64	78



Find the regression line (linear model) that can be used to predict an employee's performance rating if their attitude rating is known.

- (A) $y = -0.669x + 92.3$ (C) $y = 1.02x + 11.7$
 (B) $y = 2.02x - 47.3$ (D) $y = 1.51x + 34.2$

(7) Use the properties of logarithms to solve for x : $\ln(3x - 4) = \ln 20 - \ln(x - 5)$
 (Hint: Don't forget the domain of the \ln function.)

- (A) $x = 5, \frac{5}{3}$ (C) $x = -5, \frac{-19}{3}$
 (B) $x = 0, \frac{19}{3}$ (D) $x = \frac{19}{3}$

(8) A country has a population growth rate of 2.4% compounded continuously (i.e. $A = Pe^{rt}$). At this rate, how long will it take for the population to double?

- (A) 28.9 years (C) 2.9 years
 (B) 0.29 years (D) 30 years

(9) Find the equation of any horizontal asymptote: $f(x) = \frac{9x^2 - 7x - 5}{5x^2 - 9x + 8}$

- (A) $y = \frac{7}{9}$ (C) $y = 0$
 (B) $y = \frac{9}{5}$ (D) None

- (10) Solve the system using any method:
- $$\begin{aligned}2x - y &= 4 \\6x - 3y &= -18\end{aligned}$$
- (A) There are no solutions. (C) There is a unique solution.
(B) There are infinite solutions. (D) None of the above.

2 Short Answer (3 points each)

Please number each problem clearly, show all of your work, and circle your final answer.

- (11) Consider a retail chain selling cell phones. The retail price $p(x)$ (in dollars) and the weekly demand x for a particular phone are related by the function $p(x) = 625 - 5\sqrt{x}$, where $50 \leq x \leq 500$.

- (i) *Describe* how the graph of the function $p(x)$ can be obtained from the graph of one of the six elementary functions: $y = x, y = x^2, y = x^3, y = \sqrt{x}, y = \sqrt[3]{x}$, or $y = |x|$. (i.e. list the transformations)
- (ii) *Graph* the function $p(x)$.

- (12) Find the equations of any vertical asymptotes: $f(x) = \frac{x^2 + 5x}{x^2 - 4x - 45}$

- (13) Consider the linear system:
- $$\begin{aligned}-5x_1 + 3x_2 &= 8 \\3x_1 - 6x_2 &= -30\end{aligned}$$

- (i) *Translate* the linear system into an augmented matrix.
- (ii) *Solve* the system using any method.

- (14) An initial investment of \$15,000 is invested for 2 years in an account that earns 5% interest. Find the amount of money in the account at the end of the period

- (i) if the amount is compounded continuously.
- (ii) if the amount is compounded quarterly.

3 Extra Credit (2 points)

What do you call a pumpkin whose circumference is divided by its diameter?