==1 =2.8cm=usual =1

1. Please cross $\boxed{\times}$ the correct answers.
2. This test will be exactly 120 minutes in length. When you are told to begin, but not before, glance through the entire test and put your name on each page. It is YOUR RESPONSIBILITY to make sure your test consists of 10 PAGES with 20 PROBLEMS. Each problem has an equal point value of 8 points. Use the back of the test pages for scratch work.

**Sign your name:**

13 =1.5in =0.55cm =1cm=0.4cm

The set of critical points of the function $f(x) = (x^3 - 8)^{\frac{1}{4}}$ consists exactly of the points:

there are no critical points $\{0\}$ $\{-2, 2\}$ $\{-2, -1, 1, 2\}$ $\{-2, 0, 2\}$

The absolute minimum and maximum values of the function

$$4x^2 + 4x + 6, -1 \leq x \leq 1$$

are:

minimum value 2, maximum value 7 minimum value 1, maximum value 4 minimum value -5, maximum value 4 minimum value +5, maximum value -4 minimum value 5, maximum value 14??

The function $f(x) = 2x^2 - x^4$ is increasing on the set:

$(-1, 1)$ $(-\infty, -1) \cup (1, \infty)$ $(0, 1) \cup (1, \infty)$ $(-\infty, -1) \cup (0, 1)$ $(-\infty, -1) \cup (0, \infty)$.

Find $\lim_{X \to -\infty} \frac{x^5 - 1}{x^3 + 1}$ 0 $-\infty$ $\frac{5}{3}$ $\infty$ -1

Find $\lim_{X \to -\infty} \frac{\sqrt{5x^4 + 4x^3}}{x^2 + x + 1}$

$\frac{4}{3}$ $\sqrt{5}$ $-\sqrt{5}$ $\infty$ $-\frac{4}{3}$

Find $\lim_{X \to \infty} \frac{\sin x}{x}$. (Hint: Think of the size of the values of $\sin x$ and compare to those of $x$.

$\infty$ 0 $-\infty$ 1 does not exist

Find $\lim_{x \to \infty} \frac{\sqrt{x^2 + 2x} - x}{x + 1}$

0 1 $-\infty$ $\infty$ 2

Questions 11, 12, 13, 14 refer to the $f$ in $y = f?y$ whose graph is shown below.

The domain of $f(x)$ is:

$(-\infty, 0) \cup (2, \infty)$ $(-\infty, 2) \cup (2, \infty)$ $(-\infty, 0) \cup (0, \infty)$ $(-\infty, 0) \cup (0, 2) \cup (2, \infty)$ $(-\infty, \infty)$

The equations of the horizontal asymptotes are

$\{y = 2, y = -2, y = 0\}$ $\{y = 2, y = -2\}$ $\{y - 2, y = 0\}$ $\{y = -2, y = 0\}$ $\{y = 0, y = -2\}$

The graph is concave up on

$(-\infty, -3) \cup (0, 2) \cup (1, 5)$. $(-\infty, 0) \cup (0, 2) \cup (2, 5)$ $(-3; 0) \cup (5, \infty)$ $(0, 2) \cup (2, 5)$ $(-\infty, 2) \cup (5, \infty)$

Which of the following is true.

The graph has exactly one infle?? point The graph has two vertical asymptotes The graph has 3 - horizontal asymptotes. The graph has no absolute maximum and no absolute minimum. The absolute minimum value is negative.

consider the function $f(x) = 2x3x^5 - 10x^3$ on $[0, \infty)$. The set of points where the function is concave down is:

(0,3) (0,1) $(1, \infty)$ (0, 5) (3, 5).

A 12-inch long piece of wire AB is bent somewhere in the middle to form a 90° angle. (See figure) What is the shortest distance $\overline{CB}$ which can be obtained? (see attached sheet)

12 inches 72 inches $\sqrt{2}6$ inches $6\sqrt{2}$ inches no shortest distance exists

A closed cylindrical drum of colume $2000m^3$ is to be made having minimum surface area. Find its radius [Note: A cylindrical solid of radius $r$ and height $h$ has volume $^2h$ and surface area equal to $2\Pi r^2 + 2\Pi r^h$].

A rectangular poster of area $10,000cm^2$ is to be colored and a 5cm blank margin left at top, bottom and both sides. Find the dimensions of the poster which maximises the area of the colored rectangle.

$100 \times 100$ $120 \times 83\frac{1}{3}$ $50 \times 200$ ??????? $500 \times 200$

The following is known about the function $f(x)$:

$$f''(x) = \sin x; f($$

$\pi - 1$ $\pi$ $\pi + 1$ 0 $\pi + 2$

The sum $x - 2x^2 + 3x^3 + 4x^4 + \ldots + 47x^{47} - 48x^{48}$ when written in sigma notation has the form:

$\sum_{n=0}^{48}(-1)^{n+1}x^n$ $\sum_{n=1}^{48}(-1)^{n+1}nx^4$ $\sum_{n=1}^{47}(-1)^{n+1}x^4$
$\sum_{n=1}^{47}(-1)^n x^n$ $\sum_{n=0}^{46}(-1)^{n+1}x^{n+2}$.

Suppose that two random variables $X$ and $Y$ have the joint p.d.f.

$$f_{X,Y}(x,y) = \frac{xy}{18}$$

for the points $(1,1)$, $(2,1)$, $(3,1)$, $(1,2)$, $(2,2)$ and $(3,2)$, and is 0, otherwise. Find the conditional probability that $X$ is 1 given that $Y$ is 1.

$\frac{1}{6}$ $\frac{1}{3}$ $\frac{2}{5}$ $\frac{5}{18}$ $\frac{4}{9}$

Suppose that $Y_1, Y_2, Y_3$ are independent random variables each having p.d.f.

$$f_Y(x) = \begin{cases} 1 & 0 \le x \le 1 \\ 0 & \text{elsewhere} \end{cases}$$

Let $Y$ be the random variable $Y := Y_1 + Y_2 + Y_3$. Then find the moment generating function $M_Y(t)$.

$\left(\frac{e^t-1}{t}\right)^3$ $\left(\frac{e^t-1}{t}\right)^2$ $3\frac{e^t-1}{t}$ $\frac{e^{3t}-3e^t}{t}$ $\frac{1}{t^3}$

Let $X_1, X_2, \ldots, X_{36}$ and $Y_1, Y_2, \ldots, Y_{49}$ be independent random samples from distributions with means $\mu_X = 30.4$ and $\mu_Y = 32.1$ and with standard deviations $\sigma_X = 12$ and $\sigma_Y = 14$. Use the central limit theorem to approximate the value of $P[\bar{X} > \bar{Y}]$.

.27 .34 .50 .66 .73