

MATH 141
Midterm Exam I
February 20, 2003

NAME(please print legibly):_____

- No calculators are allowed on this exam.
- Please show all your work. You may use backs of pages if necessary. You may not receive full credit for a correct answer if no work is shown.

Question	Value	Score
1	11	
2	12	
3	20	
4	9	
5	7	
6	9	
7	8	
8	8	
9	16	
Total	100	

1. Given $P(2, 3)$ and $Q(5, -3)$ find the following:

(a) The distance between P and Q .

ANSWER:_____

(b) An equation of the line through P and Q .

ANSWER:_____

(c) The line through P parallel to the x-axis.

ANSWER:_____

2. Suppose $\theta = 210^\circ$.

(a) Convert θ to radians.

ANSWER: _____

(b) Find $\sin(\theta)$.

ANSWER: _____

(c) Find $\cos(\theta)$.

ANSWER: _____

(d) Find $\tan(\theta)$.

ANSWER: _____

3. Find all x such that

(a) $|5x + 3| \geq 7$

ANSWER: _____

(b) $\left| \frac{4x-2}{3} \right| < 6$

ANSWER: _____

(c) $2^{(x+6)} = 8^x$

ANSWER:_____

(d) $\log_5(x) + \log_5(x - 2) = \log_5(8)$

ANSWER:_____

4. Let $f(x) = x^2$ and $g(x) = \sqrt{x - 4}$. Find $f \circ g$ and its domain.

ANSWER:_____

5. Find the function whose graph is obtained from the graph of $f(x) = x^3$ by first stretching vertically by a factor of 3 and then shifting up 5 units.

ANSWER:_____

6. Find the inverse function for $f(x) = \ln(x + 1)$.

ANSWER:_____

7. Find the vertical asymptotes of $f(x) = \frac{5x}{(x-2)(x^2+3)}$. Justify your answer.

ANSWER:_____

8. Suppose you're snowboarding down a run at Bristol mountain. Your position from the top of the run is given by the values in the following table:

t(seconds)	0	5	10	15
s(feet)	0	6	21	46

Find your average velocity for the time period when $t = 5$ and lasting

- (a) 10 seconds

ANSWER:_____

- (b) 5 seconds

ANSWER:_____

9. Evaluate the following limits:

(a) $\lim_{x \rightarrow 1} \frac{2x^2 + 4}{x + 3}$

ANSWER: _____

(b) $\lim_{x \rightarrow 2} \frac{x^2 - 7x + 10}{x - 2}$

ANSWER: _____

(c) $\lim_{x \rightarrow 0} \frac{\sqrt{x+9}-3}{x}$

ANSWER: _____

(d) $\lim_{x \rightarrow 0} x \sin\left(\frac{1}{x}\right)$

ANSWER: _____