

Test	What does it look Like?	Converge & Diverge
Geometric		Converge: Diverge:
Divergent		Converge: Diverge:
Harmonic/Telescoping		Converge: Diverge:
Integral		Converge: Diverge:
P-Series		Converge: Diverge:
Comparison		Converge: Diverge:

Determine which series are convergent and which are divergent. State your reasoning.

$$1. \sum_{n=1}^{\infty} \frac{1}{10^n}$$

$$2. \sum_{n=1}^{\infty} \left(\frac{3}{8}\right)^{1-n}$$

$$3. \sum_{n=1}^{\infty} \frac{n}{n+2}$$

$$4. \sum_{n=1}^{\infty} \frac{5}{n}$$

$$5. \sum_{n=1}^{\infty} \frac{\sin^2 n}{2^n}$$

$$6. \sum_{n=1}^{\infty} \frac{1}{n\sqrt{n}}$$

Supplement: Geometric, Divergent, Integral, P-Series, & Comparison Infinite Series Day 4

Determine which series are convergent and which are divergent. State your reasoning.

7.
$$\sum_{n=2}^{\infty} \frac{\ln n}{n}$$

8.
$$\sum_{n=2}^{\infty} \frac{\sqrt{n}}{\ln n}$$

9.
$$\sum_{n=1}^{\infty} \frac{1 + \cos n}{n^2}$$

10.
$$\sum_{n=0}^{\infty} \frac{-2}{n+1}$$

11.
$$\sum_{n=1}^{\infty} \frac{2^n}{3^n}$$

12.
$$\sum_{n=1}^{\infty} \frac{1}{1 + \ln n}$$

13.
$$\sum_{n=1}^{\infty} \frac{1}{2n-1}$$

14.
$$\sum_{n=1}^{\infty} \frac{2^n}{n+1}$$

15.
$$\sum_{n=1}^{\infty} \frac{n}{n^2+1}$$

Determine which series are convergent and which are divergent. State your reasoning.

16.
$$\sum_{n=1}^{\infty} \frac{1}{n\sqrt{n}}$$

17.
$$\sum_{n=2}^{\infty} \frac{1}{n \ln(n)}$$

18.
$$\sum_{n=1}^{\infty} \frac{1}{\sqrt{n^3+2}}$$

19.
$$\sum_{n=1}^{\infty} \frac{1}{(\ln 2)^n}$$

20.
$$\sum_{n=1}^{\infty} \frac{1}{3^{n-1} + 1}$$

21.
$$\sum_{n=1}^{\infty} \frac{2x+3}{x-4}$$

Review

R1. The graph of f is shown in the figure to the right and f is twice differentiable. Which of the following has the smallest value?

I. $f(-1)$

II. $f'(-1)$

III. $f''(-1)$

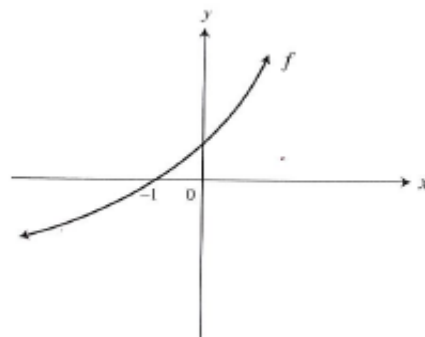
a. I

b. II

c. III

d. I & II

e. II & III



Review continued

R2. If $\frac{dy}{dx} = 3e^{2x}$, and at $x=0$, $y = \frac{5}{2}$, as solution to the differential equation is

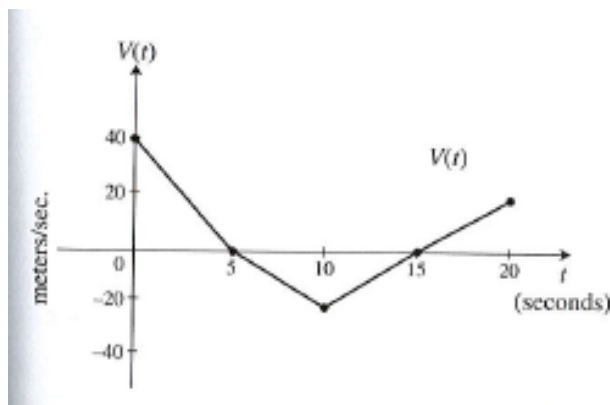
- a. $3e^{2x} - \frac{1}{2}$ b. $3e^{2x} + \frac{1}{2}$ c. $\frac{3}{2}e^{2x} + 1$
 d. $\frac{3}{2}e^{2x} + 2$ e. $\frac{3}{2}e^{2x} + 5$

R3. The position function of a moving particle is $s(t) = \frac{t^3}{6} - \frac{t^2}{2} + t - 3$ for $0 \leq t \leq 4$. What is the maximum velocity of the particle on the interval $0 \leq t \leq 4$?

- a. $\frac{1}{2}$ b. 1 c. $\frac{14}{6}$ d. 4 e. 5

R4. The graph of the velocity functions of a moving particle is shown in the figure to the right. What is the total displacement of the particle during $0 \leq t \leq 20$?

- a. 20m
 b. 50m
 c. 100m
 d. 250m
 e. 500m



R5. If $\int_{-k}^k |2x| dx = 18$ and $k > 0$ then the value(s) of k are

- a. -3
 b. $-3\sqrt{2}$
 c. 3
 d. $3\sqrt{2}$
 e. 9

R6. A function f is continuous on $[-1, 1]$ and some of the values of are shown below:

x	-1	0	1
$f(x)$	2	B	-2

If $f(x)=0$ has only one solution, r , and $r < 0$, then a possible value of b is

- a. 3
 b. 2
 c. 1
 d. 0
 e. -1

Answers:

1. Converges 2. Diverges 3. Diverges 4. Diverges
 5. Converges 6. Converges 7. Diverges 8. Diverges
 9. Converges 10. Diverges 11. Converges 12. Diverges
 13. Diverges 14. Diverges 15. Diverges 16. Converges
 17. Diverges 18. Converges 19. Diverges 20. Converges
 21. Diverges R1. A R2. C R3. E R4. B R5. C R6. E