

Compito 1:

1. Sol: $F(x) = (7 + x^2) \log(7 + x^2) - x^2 + \text{costante}$
 2. Sol: $\tilde{y}(x) = c_1 + c_2 e^{-x} + c_3 e^{-2x} + \frac{1}{2}x^2 - x$
 3. Sol: $\{(x, y) \in \mathbb{R}^2 : x^2 + y^2 = 3 \quad \text{o} \quad x^2 + y^2 = 4\}$
 4. Sol: $(0, 0)$ è punto di minimo
 5. Sol: $m = \frac{7}{8}$ e $M = 2$
 6. Sol: $\alpha = \frac{2}{3}$
 7. Sol: $\frac{2}{3} (5^{3/2} - 1)$
 8. Sol: $\frac{3}{4}$
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Compito 2:

1. Sol: $F(x) = (6 + x^2) \log(6 + x^2) - x^2 + \text{costante}$
 2. Sol: $\tilde{y}(x) = c_1 + c_2 e^{-x} + c_3 e^{-3x} + \frac{1}{2}x^2 - x$
 3. Sol: $\{(x, y) \in \mathbb{R}^2 : x^2 + y^2 = 5 \quad \text{o} \quad x^2 + y^2 = 8\}$
 4. Sol: $(0, 0)$ è punto di minimo
 5. Sol: $m = \frac{11}{12}$ e $M = 3$
 6. Sol: $\alpha = \frac{2}{5}$
 7. Sol: $\frac{2}{3} (10^{3/2} - 1)$
 8. Sol: $\frac{5}{4}$
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Compito 3:

1. Sol: $F(x) = (5 + x^2) \log(5 + x^2) - x^2 + \text{costante}$
2. Sol: $\tilde{y}(x) = c_1 + c_2 e^{-x} + c_3 e^{-4x} + \frac{1}{2}x^2 - x$
3. Sol: $\{(x, y) \in \mathbb{R}^2 : x^2 + y^2 = 7 \quad \text{o} \quad x^2 + y^2 = 12\}$
4. Sol: $(0, 0)$ è punto di minimo
5. Sol: $m = \frac{15}{16}$ e $M = 4$
6. Sol: $\alpha = \frac{2}{7}$
7. Sol: $\frac{2}{3} (17^{3/2} - 1)$
8. Sol: $\frac{7}{4}$

Compito 4:

1. Sol: $F(x) = (4 + x^2) \log(4 + x^2) - x^2 + \text{costante}$
2. Sol: $\tilde{y}(x) = c_1 + c_2 e^{-x} + c_3 e^{-5x} + \frac{1}{2}x^2 - x$
3. Sol: $\{(x, y) \in \mathbb{R}^2 : x^2 + y^2 = 9 \quad \text{o} \quad x^2 + y^2 = 16\}$
4. Sol: $(0, 0)$ è punto di minimo
5. Sol: $m = \frac{19}{20}$ e $M = 5$
6. Sol: $\alpha = \frac{2}{9}$
7. Sol: $\frac{2}{3} (26^{3/2} - 1)$
8. Sol: $\frac{9}{4}$

Compito 5:

1. Sol: $F(x) = (3 + x^2) \log(3 + x^2) - x^2 + \text{costante}$
2. Sol: $\tilde{y}(x) = c_1 + c_2 e^{-x} + c_3 e^{-6x} + \frac{1}{2}x^2 - x$
3. Sol: $\{(x, y) \in \mathbb{R}^2 : x^2 + y^2 = 11 \quad \text{o} \quad x^2 + y^2 = 20\}$
4. Sol: $(0, 0)$ è punto di minimo
5. Sol: $m = \frac{23}{24}$ e $M = 6$
6. Sol: $\alpha = \frac{2}{11}$
7. Sol: $\frac{2}{3} (37^{3/2} - 1)$
8. Sol: $\frac{11}{4}$

Compito 6:

1. Sol: $F(x) = (2 + x^2) \log(2 + x^2) - x^2 + \text{costante}$
 2. Sol: $\tilde{y}(x) = c_1 + c_2 e^{-x} + c_3 e^{-7x} + \frac{1}{2}x^2 - x$
 3. Sol: $\{(x, y) \in \mathbb{R}^2 : x^2 + y^2 = 13 \quad \text{o} \quad x^2 + y^2 = 24\}$
 4. Sol: $(0, 0)$ è punto di minimo
 5. Sol: $m = \frac{27}{28}$ e $M = 7$
 6. Sol: $\alpha = \frac{2}{13}$
 7. Sol: $\frac{2}{3} (50^{3/2} - 1)$
 8. Sol: $\frac{13}{4}$
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