

**MATHEMATICS****Section Exam 3:**  
**Polynomials and Compound  
Growth**

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- 1) Add the polynomials  $8x^2 - 17x - 10 + x^3$  and  $21 - 7x + 4x^2 - 3x^3$ .
- a.  $-2x^3 + 12x^2 - 24x + 11$   
b.  $2x^3 + 12x^2 - 24x + 11$   
c.  $-2x^3 + 12x^2 - 24x - 11$   
d.  $x^3 - 12x^2 + 24x + 11$   
e.  $24x - 2x^3 + 6x^2 + 11$
- 2) Find the largest coefficient in the expansion of  $(4 - 2x)^4$ .
- a. 32  
b. 512  
c. 128  
d. 384  
e. 16
- 3) A sum of money is invested at 12% annual simple interest. After how many years will the interest paid equal the initial principal?
- a. 7  
b. 8  
c. 9  
d. 10  
e. 11
- 4) Expand  $(x - 1)(x + 2)(x - 3)(x + 4)$ .
- a.  $2x^4 + x^3 - 13x^2 - 14x + 24$   
b.  $x^4 + 2x^3 - 13x^2 - 14x + 24$   
c.  $x^4 + 2x^3 - 13x^2 - 7x + 12$   
d.  $x^4 + 2x^3 + 13x^2 + 14x + 20$   
e.  $2x^4 + x^3 - 3x^2 + 7x + 24$
- 5) The expansion of  $(x - 1)(x - 2)(x - 3)(x + 4)$  has the same leading term as the expansion of
- a.  $(4 - x)^2 \left(\frac{x}{2} - 1\right)^2$   
b.  $(1 - x)^2 (2x + 4)^2$   
c.  $(4 - x)^3 (x + 1)$   
d.  $(2 - x)^2 (x - 2)^2$   
e.  $(4 - x)^2 (x + 1)^2$

- 6) A sum of money earns simple interest of 1.2% per month. After 4 years, it is worth \$18,676. What is the original amount?
- a. \$11,920.75  
b. \$11,850.25  
c. \$11,675.75  
d. \$11,625.25  
e. \$11,265.75
- 7) What is the leading coefficient of the expansion of  $(5 - 2x)^4$ ?
- a. 16  
b. 17  
c. 18  
d. 19  
e. 20
- 8) What is the sum of coefficients in the expansion of  $(x + 2)^2(3 - x)^3$ ?
- a. 22  
b. 3  
c. 4  
d. -36  
e. -72
- 9) A \$5,000 deposit earns simple interest of 0.4% per month. How many months does it take for the deposit to double in value?
- a. 211  
b. 238  
c. 242  
d. 230  
e. 250
- 10) Find the product of the polynomials  $3x - 2x^4 + 6x^2 - 18$  and  $x^2 - x^3 + x$ .
- a.  $2x^7 - 2x^6 - 8x^5 + 3x^4 + 27x^3 - 15x^2 - 18x$   
b.  $2x^7 - 2x^6 - 8x^5 + 9x^4 + 27x^3 - 18x^2 - 15x$   
c.  $x^7 - x^6 - 4x^5 + 3x^4 + 27x^3 - 15x^2 - 18x$   
d.  $2x^7 - 2x^6 - 8x^5 + 3x^4 + 27x^3 + 5x^2 + 18x$   
e.  $2x^7 - 2x^6 + 4x^5 - 3x^4 + 9x^3 - 15x^2 - 18x$
- 11) A sum of \$25,750 is continuously compounded at an interest rate of 2.4%. How much is it worth after 2 years?
- a. \$28,128  
b. \$52,901  
c. \$29,892  
d. \$52,735  
e. \$41,614

- 12) How many terms compose the polynomial  $\sum_{i=-2}^3 a_i x^i$ ?
- a. 10
  - b. 9
  - c. 8
  - d. 7
  - e. 6
- 13) An investment of \$25,000 accrues 2.0% interest compounded quarterly. After what year will it be worth more than \$100,000?
- a. 14<sup>rd</sup>
  - b. 70<sup>th</sup>
  - c. 35<sup>th</sup>
  - d. 91<sup>th</sup>
  - e. 7<sup>th</sup>
- 14) Simplify  $(1 + x)^4 - (1 + x)^3$ .
- a.  $x^4 + 3x^3 + 3x^2 - x$
  - b.  $x^4 - 3x^3 - 3x^2 + x$
  - c.  $x^4 + 3x^3 + 3x^2 + x$
  - d.  $3x^4 + x^3 + x^2 + 3x$
  - e.  $x^4 + 2x^3 + 2x^2 + x$
- \$2,000 is deposited in an account that pays 12% compound interest once a year. How many years does it take for the investment to:
- 15) ... quadruple in value?      16) ... exceed \$20,000 in value?
- a. 13
  - b. 14
  - c. 17
  - d. 18
  - e. 19
- a. 17
  - b. 18
  - c. 19
  - d. 21
  - e. 23
- 17) Find the sum of coefficients in the expansion of  $(2x + y)^5$ .
- a. 108
  - b. 324
  - c. 162
  - d. 243
  - e. 291
- 18) Find the coefficient of  $x^3$  in the expansion of  $(3 - 4x)(1 + x)^4$ .
- a. -16
  - b. -12
  - c. 14
  - d. 11
  - e. 10

- 19) A sample undergoes constant continuous growth. Over a period of 2 days, it grows from 25.0g to 33.746g. What is its size after one week?
- a. 59.7g
  - b. 61.3g
  - c. 64.3g
  - d. 69.4g
  - e. 71.4g
- 20)  $f(x) = 4x^2 + 9x^3 - 21x$  and  $g(x) = 8x - 2x^3 - 4x^2$ . Find  $f(x) + g(x)$ .
- a.  $13x^3 + 7x$
  - b.  $7x^3 - 13x$
  - c.  $7x - 13x^2$
  - d.  $7x + 13x^3$
  - e.  $7x^4 - 13x^2$
- 21) Factor  $x^6 - y^6$ .
- a.  $(x^3 + y^3)(x^3 - y^3)$
  - b.  $(x^3 + y^3)^2$
  - c.  $(x^3 - y^3)^2$
  - d.  $(x^3 + xy + y^3)^2$
  - e.  $(x^3 + y^3)^4$
- 22) After 6 years, a \$30,000 investment is worth \$45,108.91. What was the annually compounded interest rate?
- a. 4%
  - b. 5%
  - c. 6%
  - d. 7%
  - e. 8%
- 23) Find the sum of coefficients in the expansion of  $(5 - x)^6$ .
- a. 3,872
  - b. 3,980
  - c. 4,096
  - d. 4,120
  - e. 4,342
- 24) Find the coefficient of the  $x^3$  term of the expansion of  $(\frac{3}{2}x - 4)^3$ .
- a.  $\frac{17}{4}$
  - b.  $\frac{21}{8}$
  - c.  $\frac{27}{4}$
  - d.  $\frac{23}{8}$
  - e.  $\frac{27}{8}$

- 25) A sum of \$40,000 grows to \$111,000 in 8 years. If the amount accrues continuously compounded interest, what is the interest rate?
- a. 12.2%
  - b. 12.4%
  - c. 12.8%
  - d. 13.2%
  - e. 13.6%
- 26) Evaluate  $\sum_{n=0}^{\infty} x^n$  for  $x = \frac{1}{3}$ .
- a. 1.5
  - b. 2
  - c. 2.5
  - d. 3
  - e. 3.5
- 27) Find the coefficient of  $x^2$  in the expansion of  $(x^2 - \frac{2}{x})^4$ .
- a. 24
  - b. 25
  - c. 27
  - d. 28
  - e. 30
- 28) A certain medicine has a half-life of 4.2 hours in the human body. If 10g is ingested, how much remains after 8 hours?
- a. 2.31g
  - b. 2.43g
  - c. 2.67g
  - d. 2.72g
  - e. 2.91g
- 29) Expand  $(x - 4)^2(x + 4)$ .
- a.  $x^3 + 4x^2 - 16x - 32$
  - b.  $x^3 - 4x^2 - 16x + 64$
  - c.  $2x^3 - 4x^2 - 8x + 16$
  - d.  $x^3 - 2x^2 - 4x + 8$
  - e.  $2x^3 - 4x^2 + 8x + 16$
- 30) \$10,250 is invested in an account that gives 1.6% interest compounded twice a year. How much is in the account after 9 years?
- a. \$11,726
  - b. \$11,012.06
  - c. \$13,202
  - d. \$11,830.78
  - e. \$11,819.81

- 31) What term has the largest coefficient in  $\sum_{i=1}^4 2^{4-n}x^n$ ?
- a.  $x^2$
  - b.  $x^1$
  - c.  $x^3$
  - d.  $x^0$
  - e.  $x^4$
- 32) Find the coefficient of the  $x^6$  term in the expansion of  $(x - 8)^7$ .
- a. -49
  - b. 50
  - c. 52
  - d. -56
  - e. -64
- 33) A deposit of \$5,600 grows to \$5,963.17 over 3 years. What is the interest rate per annum at which compound interest is paid quarterly?
- a. 1.4%
  - b. 1.8%
  - c. 2.1%
  - d. 2.4%
  - e. 2.9%
- 34) Evaluate  $\sum_{i=1}^4 a_i x^i$  for  $x = -2$ ,  $a_i = 3i$ .
- a. 121
  - b. 128
  - c. 132
  - d. 136
  - e. 138
- 35) What is the largest coefficient in the expansion of  $(2x + 3)^6$ ?
- a. 3,240
  - b. 2,916
  - c. 5,832
  - d. 1,944
  - e. 4,860