

# Demo AS Core Questions

Please answer on file paper.

1: Work out the following:

a) Give the order of  $8x^{19} + 7x^{16} - 4x^{20}$

b) Give the order of  $x^{10} + 10x^6 + 4x^{17} - 6x^9$

2: Work out the following:

a)  $(6x^3 - x^2 - 2x + 8) + (3x^3 + 6x^2 + x - 10)$

b)  $(-7x^3 - 8x^2 + 4x + 2) + (-8x^3 - 9x^2 + 10x - 6)$

3: Work out the following:

a)  $(-10x^3 - 7x^2 + 7x + 5) - (-2x^3 - 3x - 4)$

b)  $(-9x^3 + 3x^2 + 9x - 5) - (9x^3 - 8x^2 + 6x + 1)$

4: Work out the following:

a)  $(-5x - 10) \times (-3x^3 + 8x^2 - 7x)$

b)  $(2x - 1) \times (5x^3 - 6x^2 + 5x + 4)$

5: Work out the following:

a)  $(-x^2 - 3x - 4) \times (-4x^2 + 3x - 5)$

b)  $(-8x^2 - 9x + 9) \times (10x^2 + 2x - 2)$

6: Work out the following:

a)  $(x^3 - 93x - 70) \div (x - 10)$

b)  $(6x^3 - 13x^2 - 55x - 36) \div (2x - 9)$

7: Work out the following:

a) Is  $(x - 5)$  a factor of  $x^3 + 4x^2 - 17x - 60$ ?

b) Is  $(x - 3)$  a factor of  $x^3 - 7x + 6$ ?

8: Work out the following:

a) Factorise  $x^3 - 8x^2 + 11x + 20$

b) Factorise  $x^3 + 4x^2 - 7x - 10$

9: Work out the following:

a) Find the remainder when  $x^3 - 5x^2 - 2x + 24$  is divided by  $(x + 3)$ .

b) Find the remainder when  $x^3 + x^2 - 10x + 8$  is divided by  $(x + 2)$ .

10: Expand and simplify the following:

a)  $(1 + k)^3$

b)  $(1 + t)^5$

11: Expand and simplify the following:

a)  $(1 - g)^5$

b)  $(1 + 2m)^5$

12: Expand and simplify the following:

a)  $(4 - 3h)^4$

b)  $(3 + w)^3$

13: Expand and simplify the following:

a)  $(1 + v^3)^4$

b)  $(1 + p^2)^5$

14: Expand and simplify the following:

a)  $(4x - q)^5$

b)  $(2z + s)^5$

15: Differentiate the following with respect to  $x$ :

a)  $-7x^5 - x^{10} + 2$

b)  $-5x^7 + 5x^4 + 6x^3 - 2x^2$

16: Differentiate the following with respect to  $x$ :

a)  $-\frac{6}{x^8} - \frac{3}{x^9} + 9x + 8x^6$

b)  $3x^{10} - \frac{1}{x^7} - \frac{10}{x^5}$

17: Find the gradient at the given point:

a)  $y = 3x + 1$  at  $x = 3$

b)  $y = -5x^3 + x^2 - 9$  at  $x = 2$

18: Find the co-ordinates and nature of any turning points:

a)  $y = x^3 - 6x^2 - 36x - 8$

b)  $y = -x^2 + 2x + 5$

# Answers: Demo AS Core Questions

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1: a) Order 20

b) Order 17

2: a)  $9x^3 + 5x^2 - x - 2$

b)  $-15x^3 - 17x^2 + 14x - 4$

3: a)  $-8x^3 - 7x^2 + 10x + 9$

b)  $-18x^3 + 11x^2 + 3x - 6$

4: a)  $15x^4 - 10x^3 - 45x^2 + 70x$

b)  $10x^4 - 17x^3 + 16x^2 + 3x - 4$

5: a)  $4x^4 + 9x^3 + 12x^2 + 3x + 20$

b)  $-80x^4 - 106x^3 + 88x^2 + 36x - 18$

6: a)  $x^2 + 10x + 7$

b)  $3x^2 + 7x + 4$

7: a) No:  $f(5) = 80$

b) No:  $f(3) = 12$

8: a)  $(x - 4)(x + 1)(x - 5)$

b)  $(x - 2)(x + 1)(x + 5)$

9: a)  $f(-3) = -42$

b)  $f(-2) = 24$

10: a)  $1 + 3k + 3k^2 + k^3$

b)  $1 + 5t + 10t^2 + 10t^3 + 5t^4 + t^5$

11: a)  $1 - 5g + 10g^2 - 10g^3 + 5g^4 - g^5$

b)  $1 + 10m + 40m^2 + 80m^3 + 80m^4 + 32m^5$

12: a)  $256 - 768h + 864h^2 - 432h^3 + 81h^4$

b)  $27 + 27w + 9w^2 + w^3$

13: a)  $1 + 4v^3 + 6v^6 + 4v^9 + v^{12}$

b)  $1 + 5p^2 + 10p^4 + 10p^6 + 5p^8 + p^{10}$

14: a)  $1024x^5 - 1280x^4q + 640x^3q^2 - 160x^2q^3 + 20xq^4 - q^5$

b)  $32z^5 + 80z^4s + 80z^3s^2 + 40z^2s^3 + 10zs^4 + s^5$

15: a)  $-35x^4 - 10x^9$

b)  $-35x^6 + 20x^3 + 18x^2 - 4x$

16: a)  $\frac{48}{x^9} + \frac{27}{x^{10}} + 9 + 48x^5$

b)  $30x^9 + \frac{7}{x^8} + \frac{50}{x^6}$

17: a) 3

b) -56

18: a) (6, -224) min; (-2, 32) max

b) (1, 6) max