WEEK 5 - Tutorial (2) Exercises

EXERCISE 11.9

Find the value of:

1. $\lim_{x \to 2} 5x - 3$

2. $\lim_{x \to 5} x^2 - x$

3. $\lim_{x \to 1} \dfrac{x^2 - 1}{x^2 + 1}$

4. $\lim_{x \to 2} \dfrac{x^2 - 4}{x - 2}$

5. $\lim_{x \to 2} \dfrac{x + 4}{x}$

6. $\lim_{x \to 2} \dfrac{2 - x}{x}$

7. $\lim_{x \to 0} \dfrac{x^2 - x}{x}$

8. $\lim_{x \to -5} \dfrac{x^2 - 25}{x + 5}$

9. $\lim_{x \to 1} \dfrac{x^2 - 3x + 2}{x - 1}$

10. $\lim_{x \to 4} \dfrac{x - 4}{x^2 - 16}$

11. $\lim_{x \to 2} \dfrac{x^2 + x - 6}{x^2 - 4}$

12. $\lim_{x \to a} \dfrac{x^2 - ax}{x - a}$

EXERCISE 11.10

Find the value of:

1. $\lim_{x \to \infty} \dfrac{2x}{x + 2}$

2. $\lim_{x \to \infty} \dfrac{3}{x + 1}$

3. $\lim_{x \to \infty} \dfrac{2x^2}{5x^2 + 1}$

4. $\lim_{x \to \infty} \dfrac{5x - 4}{2x + 1}$

5. $\lim_{x \to \infty} \dfrac{4x^2 + x}{x^2 + 2x + 1}$

6. $\lim_{x \to \infty} \dfrac{x^2 + 2x - 3}{3x^2 - x + 2}$

EXERCISES 14(a)

Evaluate the following limits (1. to 22.):

1. $\lim_{x \to 3} (3x)$

2. $\lim_{x \to -1} (x^2 + 4x)$

3. $\lim_{x \to 3} (9 - x^2)$

4. $\lim_{x \to -2} (x^2 - 2x + 1)$

5. $\lim_{x \to -4} x^2(x + 2)$

6. $\lim_{h \to 2} (h^2 - 4h + 4)$

7. $\lim_{a \to -1} (a + 3)(a - 4)$

8. $\lim_{x \to 3} \dfrac{x^2 - 5}{x + 2}$

9. $\lim_{x \to -3} \dfrac{(x + 5)(x + 3)}{x + 3}$

10. $\lim_{x \to 0} \dfrac{x^2 + 5x}{x}$

11. $\lim_{x \to -2} \dfrac{x^3 + 8}{x + 2}$

12. $\lim_{x \to 3} \dfrac{x^2 - 5x + 6}{x - 3}$

13. $\lim_{x \to 3} \dfrac{3x}{x + 2}$

14. $\lim_{x \to 5} \dfrac{x - 5}{2x^2 - 9x - 5}$

15. $\lim_{x \to 1} \dfrac{x - 1}{x^2 + x - 2}$

16. $\lim_{x \to -4} \dfrac{x - 1}{x^2 + x - 2}$

17. $\lim_{x \to -2} \dfrac{x + 2}{x^2 - 4}$

18. $\lim_{h \to 0} \dfrac{2x^2h + 3h}{h}$

19. $\lim_{h \to 0} \dfrac{(2 + h)^2 - 4}{h}$

20. $\lim_{h \to 0} \dfrac{(1 + h)^3 - 1}{h}$

ANSWERS

EXERCISE 11.9

1. 7	2. 20	3. 0	4. 4
5. 3	6. 0	7. −1	8. −10
9. −1	10. $\frac{1}{8}$	11. $1\frac{1}{4}$	12. a

EXERCISE 11.10

1. 2	2. 0	3. $\frac{2}{5}$
4. $2\frac{1}{2}$	5. 4	6. $\frac{1}{3}$

EXERCISES 14(a)

1. 9	2. −3	3. 0	4. 9	5. −32	6. 0	7. −10	8. 0·8
9. 2	10. 5	11. 12	12. 1	13. 1·8	14. $\frac{1}{11}$	15. $\frac{1}{3}$	16. $\frac{1}{6}$

Qu ①   If $f(x) = 2x^2 + 1$

(i) Find $f(5) =$

(ii) Find $f(n+1) =$

(iii) Find $f(x+h) =$

(iv) Show that: $f(x+h) - f(x) = 2h(2x+h)$

(v) Hence find: $\displaystyle\lim_{h \to 0} \frac{f(x+h) - f(x)}{h}$

Qu ②

Find the "gradient formula" for the following graphs.

(i) $y = x^3$ (ii) $y = 6x^2$ (iii) $y = x^4 - 3x^2$

(iv) $y = 8x^1$ (v) $y = 5x^3 + 8x$ (vi) $y = x^2 - 5x + 4$

ANSWERS Qu② (i) $3x^2$ (ii) $12x$ (iii) $4x^3 - 6x$ (iv) 8 (v) $15x^2 + 8$ (vi) $2x - 5$