

# The Weekly Rigor

No. 232

“A mathematician is a machine for turning coffee into theorems.”

December 1, 2018

## 20 Problems in Calculating Type 5 Difference Quotients

(Part 1)

$$\frac{f(b) - f(a)}{b - a}$$

### PROBLEMS

1.  $f(x) = x$

2.  $f(x) = x^2$

3.  $f(x) = x^3$

4.  $f(x) = 2x^3$

5.  $f(x) = 2x^2 + 5$

6.  $-5x^2 + 3x$

7.  $f(x) = x^3 - 2x^2 + 3$

8.  $f(x) = 3x^2 - 5x + 4$

9.  $f(x) = mx + c$

10.  $f(x) = px^2 + qx + r$

11.  $f(x) = \frac{1}{x}$

12.  $f(x) = \frac{1}{x+2}$

13.  $f(x) = \frac{7}{x+2}$

14.  $f(x) = \frac{7}{5x+2}$

15.  $f(x) = \sqrt{x}$

16.  $f(x) = \sqrt{x-3}$

17.  $f(x) = \sqrt{x^2+1}$

18.  $f(x) = \sqrt{3x^2+x}$

19.  $f(x) = \frac{1}{\sqrt{x}}$

20.  $f(x) = \frac{1}{\sqrt{x+2}}$

## ANSWERS

1. 1	2. $b+a$
3. $b^2+ab+a^2$	4. $2b^2+2ab+2a^2$
5. $2(b+a)$	6. $-5b-5a+3$
7. $b^2+ab+a^2-2b-2a$	8. $3b+3a-5$
9. $m$	10. $pb+pa+q$
11. $\frac{-1}{ab}$	12. $\frac{-1}{(a+2)(b+2)}$
13. $\frac{-7}{(a+2)(b+2)}$	14. $\frac{-35}{(5b+2)(5a+2)}$
15. $\frac{1}{\sqrt{b}+\sqrt{a}}$	16. $\frac{1}{\sqrt{b-3}+\sqrt{a-3}}$
17. $\frac{b+a}{\sqrt{b^2+1}+\sqrt{a^2+1}}$	18. $\frac{3b+3a+1}{\sqrt{3b^2+b}+\sqrt{3a^2+a}}$
19. $\frac{-1}{\sqrt{a}\sqrt{b}(\sqrt{a}+\sqrt{b})}$	20. $\frac{-1}{\sqrt{a+2}\sqrt{b+2}(\sqrt{a+2}+\sqrt{b+2})}$

“Only he who never plays, never loses.”