PMTH 091/092 Diagnostic Test

Success in a first year Calculus class is highly dependent on your algebra skills. The following is a self diagnostic test to be taken by students to prior to deciding to take PMTH 091 or PMTH 092.

To have a valid self-assessment, follow these instructions carefully.

- Complete the following test in no more than 60 minutes (1 hour).
- Do not use a calculator for any questions.
- Do not refer to books, notes, or other material while completing the test.
- Only select one answer per question.

Once you have completed all 30 questions, refer to the last page for scoring and recommendations.

1. Evaluate the expression $\left(\frac{1}{2}+\frac{2}{3}\right)\times\frac{1}{3}=?$
   a) 7/18
   b) 1/5
   c) 5/9
   d) 5/6

2. Simplify the following expression and combine like terms.

   $-2(3x+5)-10$

   a) $6x-20$
   b) $-6x-20$
   c) $-6x$
   d) $6x$

3. Solve the following equation for x: $2x+5=19$
   a) $x=12$
   b) $x=7$
   c) $x=\frac{19}{2}$
   d) $x=\frac{2}{7}$

4. Solve the following equation for x: $\frac{3}{x}+4=10$
   a) $x=1$
   b) $x=\frac{1}{2}$
   c) $x=\frac{1}{4}$
   d) $x=4$

5. Solve the following inequality: 3 - 7b < 73
   a) b < 7
   b) b < -10
   c) b > 13
   d) b > -10

6. What is the slope and y-intercept of the following line? *y = 3x + 4*

a) Slope: 4 and y-intercept: 3
b) Slope: -4 and y-intercept: 3
c) Slope: 3 and y-intercept: 4
d) Slope: -3 and y-intercept: 4

7. Consider the equation of a straight line in Point-Slope Form, $y-4=\frac{2}{3}(x-3)$.

What is the slope of the line and what is the y-intercept?

a) Slope: 2/3 and y-intercept: 3
b) Slope: 2/3 and y-intercept: 2
c) Slope: 2/3 and y-intercept: - 6
d) Slope: 2/3 and y-intercept: - 3

8. Find the slope of the line joining the following two points. The points are:
(- 5 , - 5) and (10, 7)

a) $m=\frac{-4}{5}$

b) $m=\frac{3}{5}$

c) $m=\frac{4}{5}$

d) $m=\frac{5}{4}$

9. Find the y-intercept of the line in question #8.

a) b=2
b) b=-2
c) b=5
d) b=-1

10. Simplify the following. Your answer should contain only positive exponents. $-3x^2y(5xy^3)$

a) $15x^3y^4$
b) $-15x^2y^3$
c) $-15x^3y^4$
d) $-15xy$

11. Simplify the following. Your answer should contain only positive exponents. $\frac{(2x^{-1}y^3)^2}{(2^2x^3y^{-2})^3}$ =

a) $\frac{y^4}{4x^5}$
b) $\frac{y^{12}}{16x^4}$
c) $\frac{y^{12}}{16x^{11}}$
d) $4x^4y^6$

12. Pick out the Polynomial Expression from the list given below.

a) $5x^3+3x^2-2x+4$
b) $-10x^4+5x^3+2\sqrt{x}-5$
c) $15x^3+25x^2-30x^{\frac{3}{2}}+10$
d) $x^3+\frac{2}{x}+5$

13. Simplify the following algebraic expression and combine like terms.

$3(-2x+4)-(10x-12)$

a) $16x+24$
b) $-16x+24$
c) $-16x$
d) $-16x-24$

14. Find the product of the following: $(x+1)(x-4)=?$

a) x^2+3x-4
b) x^2-3x+4
c) x^2-3x-4
d) x^2-4x+3

15. Find the product of the following: $(2k+1)(3k^2-2k+1)$ =?

a) $6k^3-k^2-1$
b) $6k^2-k^2+1$
c) $6k^3-4k+1$
d) $6k^3-k^2+1$

16. Simplify and combine like terms: $(x+h)^2+2-(x^2+2)$

a) h^2
b) $xh+h^2$
c) $2xh+h^2$
d) $xh+2x-h$

17. Divide: $\dfrac{10x^3+15x^2-5x}{5x^2}$

a) $2x+3+\dfrac{1}{x}$
b) $2x+3-\dfrac{1}{x}$
c) $4x^2$
d) $15x^2$

18. Factor the largest common factor out of the following expression: $18n^2-12n+18$

a) $6(3n^3-2n+3)$
b) $6(3n^2-2n+3)$
c) $6n(3n^2-2n+3)$
d) $2(3n^2-2n+1)$

19. Factor completely: $7a^3 + 28a^2 - 4a - 16$

a) $(7a^2 + 4)(7a^2 - 4)$
b) $(7a^2 - 4)(a + 4)$
c) $(a - 4)(7a^2 - 4)$
d) $(7a^2 + 4)(a + 4)$

20. Factor the following trinomial: $b^2 - 15b + 56$

a) (b + 7) (b + 8)
b) (b + 4) (b + 14)
c) (b – 7) (b – 8)
d) (b – 2) (b – 28)

21. Add the following rational expressions: $\frac{2x+5}{x^2+2} + \frac{2x-5}{x^2+2} =$

a) $\frac{4x^2 - 25}{x^2 + 2}$
b) $\frac{4x}{x^2 + 2}$
c) $\frac{4x + 10}{x^2 + 2}$
d) $4x^2 + 10x + 2$

22. Subtract the following rational expressions: $\frac{3}{x+2} - \frac{3}{x}$

a) $\frac{0}{x}$
b) $\frac{3}{x(x+2)}$
c) $\frac{-6}{x(x+2)}$
d) $3x(x + 2)$

23. Divide the following: $\dfrac{\frac{3}{4}}{\frac{3}{4}+\frac{1}{8}} =$

a) 8
b) $\frac{6}{7}$
c) $\frac{8}{9}$
d) 3

24. Simplify the following complex fraction: $\dfrac{\frac{2}{x+h}-\frac{2}{x}}{h}$

a) $\dfrac{-2h}{x(x+h)}$
b) $\dfrac{-2}{x(x+h)}$
c) $\dfrac{2h}{x(x+h)}$
d) $2h(x+h)$

25. Solve for x: $x^2 - 4 = 0$

a) x=4
b) x=4 and x=-4
c) x=2
d) x=2 and x=-2

26. Solve for x: $2x^2 - 5x = 3$

a) x=3 and x=-1/2
b) x=2 and x=3
c) x=-2 and x=1/3
d) x=1/2 and x=1

27. Evaluate the following: $64^{1/2}$

a) 32
b) 8
c) -8
d) 1/32

28. Simplify the following: $\sqrt{50}$

a) 7.07
b) $5\sqrt{2}$
c) $2\sqrt{5}$
d) 10

29. Multiply the following: $(5+\sqrt{3})(5-\sqrt{3})$

a) 16
b) $22+10\sqrt{3}$
c) 22
d) $5\sqrt{3}$

30. Multiply the following.

$(\sqrt{x+h}-\sqrt{x})(\sqrt{x+h}+\sqrt{x})=$

a) $2x+h$
b) h
c) $(\sqrt{x+h})^2+(\sqrt{x})^2$
d) x

Answers and Scoring

The answer key is given as follows.

1. a	2. b	3. b	4. b	5. d
6. c	7. b	8. c	9. d	10. c
11. c	12. a	13. b	14. c	15. d
16. c	17. b	18. b	19. b	20. c
21. b	22. c	23. b	24. b	25. d
26. a	27. b	28. b	29. c	30. b

Add up your correct answers for all 30 questions. Your score: _____ out of 30.

Recommendations:

If you scored 15 points or less, you should consider enrolling in PMTH 091 to improve your math skills before moving on.

If you scored 16 points or more, you could consider enrolling in PMTH 092.

Please Note: While your score on this test is a good indication of how well you may do in these classes, it is of course not a guarantee of either your success or failure.