Answer Key

Texas Tech University
Sample Mathematics Placement Examination

Section 1. The questions in this section measure preparation for College Algebra (Math 1320), Trigonometry (Math 1321), Introductory Mathematical Analysis (Math 1330), PreCalculus (Math 1550) or Statistical Methods (Math2300).

Answer each question.

1. $(-5)(-7) + (-16) =$

    1. ◯ [0 pts] -28
    2. ◯ [0 pts] 51
    3. ◯ [0 pts] -35
    4. ◯ [1 pts] 19
    5. ◯ [0 pts] -51

2. $5\frac{1}{4} - 2\frac{2}{3} =$

    1. ◯ [1 pts] $2\frac{7}{12}$
    2. ◯ [0 pts] $3\frac{7}{12}$
    3. ◯ [0 pts] 2
    4. ◯ [0 pts] $3\frac{5}{12}$
    5. ◯ [0 pts] 4

3. If 7 is subtracted from 3.6, then the result is

    1. ◯ [0 pts] 4.6

2. [0 pts] 3.4
3. [0 pts] 2.9
4. [1 pts] -3.4
5. [0 pts] -2.9

4. Sara receives a 7% salary increase. If Sara's salary was $\$14,000$ before the raise, what is her new salary to the nearest dollar?

1. [0 pts] $\$16,000$
2. [0 pts] $\$98,000$
3. [0 pts] $\$980$
4. [1 pts] $\$14,980$
5. [0 pts] $\$2,000$

5. If $C = \frac{5}{9}(F - 32)$ and F is 50, C =

1. [0 pts] 18
2. [0 pts] 58
3. [0 pts] -4.2
4. [0 pts] 32.4
5. [1 pts] 10

6. If $x - 3(x - 6) = 5(x + 1) - 7$, then $x =$

1. [0 pts] $\frac{12}{7}$
2. [0 pts] $-\frac{16}{7}$

3. ○ [1 pts] $\frac{20}{7}$
4. ○ [0 pts] $\frac{8}{7}$
5. ○ [0 pts] 0

7. $(-4x)^2(3x^6) =$

1. ○ [1 pts] $48x^8$
2. ○ [0 pts] $-48x^8$
3. ○ [0 pts] $144x^{14}$
4. ○ [0 pts] $48x^{12}$
5. ○ [0 pts] $-12x^8$

8. $(7x^3 - 8x^2 + 3x + 1) - (8x^3 + 7x^2 - 2) =$

1. ○ [0 pts] $-x^3 - x^2 + 3x - 1$
2. ○ [0 pts] $-x^3 - 15x^2 - 3x + 1$
3. ○ [0 pts] $15x^3 - x^2 + 3x - 1$
4. ○ [1 pts] $-x^3 - 15x^2 + 3x + 3$
5. ○ [0 pts] $-x^3 - 15x^2 + 5x + 1$

9. One of the factors of $15x^2 - 7x - 2$ is

1. ○ [0 pts] $3x + 2$
2. ○ [1 pts] $3x - 2$

3. [0 pts] $3x + 1$
4. [0 pts] $5x - 1$
5. [0 pts] $15x - 1$

10. $\frac{x^2 - 9}{x^2 - 6x + 9} =$

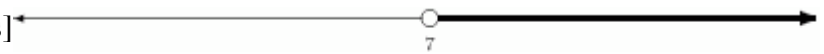
1. [0 pts] $\frac{-9}{-6x + 9}$
2. [0 pts] $\underline{1}$
3. [0 pts] $\frac{1}{6x}$
4. [0 pts] $\underline{0}$
5. [1 pts] $\frac{x + 3}{x - 3}$

11. $\frac{2x}{x^2 - 9} - \frac{1}{x + 3} =$

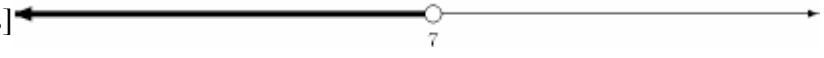
1. [0 pts] $x + 3$
2. [0 pts] $\frac{1}{x + 3}$
3. [0 pts] $\frac{2x - 1}{x^2 - 9}$
4. [0 pts] $\frac{2x - 1}{x^2 - x - 6}$
5. [1 pts] $\frac{1}{x - 3}$

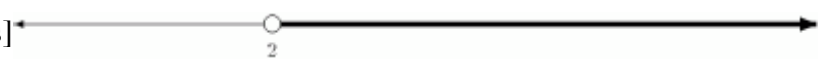
12. Of the following graphs, which best represents the solution of the inequality $2x + 5 < 9$?

1. [0 pts] 

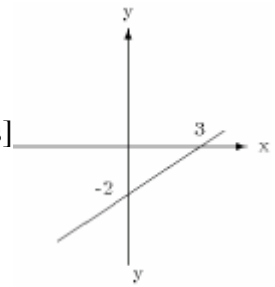
2. [0 pts] 

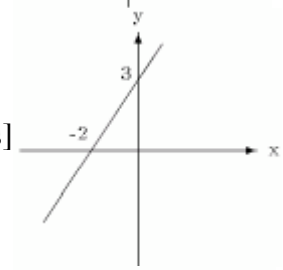
3. [1 pts] 

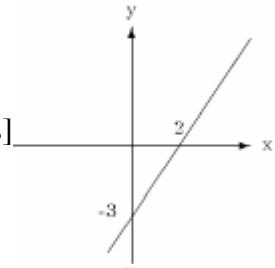
4. [0 pts] 

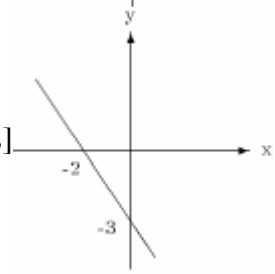
5. ○ [0 pts] 

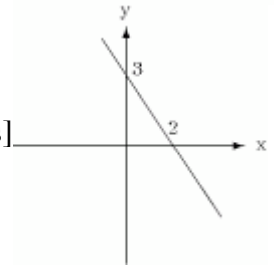
13. Of the following, which best represents the graph of the equation $3x - 2y = -6$?

1. ○ [0 pts] 

2. ○ [1 pts] 

3. ○ [0 pts] 

4. ○ [0 pts] 

5. ○ [0 pts] 

14. In the system of equations $\begin{cases} 2x + 3y = 7 \\ 2x - 3y = 4 \end{cases}$

1. [0 pts] $x = \frac{3}{4}$
2. [1 pts] $x = \frac{11}{4}$
3. [0 pts] $x = \frac{1}{2}$
4. [0 pts] $x = \frac{11}{2}$
5. [0 pts] $x = 11$

15. $\sqrt{25x} + 4\sqrt{x} =$

1. [0 pts] $4\sqrt{26x}$
2. [0 pts] $\sqrt{29x}$
3. [0 pts] $5\sqrt{26x}$
4. [1 pts] $9\sqrt{x}$
5. [0 pts] $\sqrt{41x}$

16. $\sqrt{44p^{12}q^8} =$

1. [1 pts] $2p^6q^4\sqrt{11}$
2. [0 pts] $22p^6q^4$
3. [0 pts] $2p^{10}q^6\sqrt{11}$
4. [0 pts] $2p^6q^4$
5. [0 pts] $22p^{12}q^8$

17. The solutions of the equation $3x^2 - 7x - 6 = 0$ are

1. [0 pts] -3 and $-\frac{2}{3}$
2. [1 pts] 3 and $-\frac{2}{3}$
3. [0 pts] -3 and $\frac{2}{3}$
4. [0 pts] 3 and -2
5. [0 pts] 3 and $\frac{2}{3}$

18. One of the solutions of the equation $x^2 + 2x = -5$ is

1. ○ [1 pts] $-1 + 2i$
2. ○ [0 pts] $2i$
3. ○ [0 pts] -5
4. ○ [0 pts] -7
5. ○ [0 pts] 19

19. If $y > 4$, then $|4 - y| =$

1. ○ [0 pts] $4 - y$
2. ○ [0 pts] $4 + y$
3. ○ [1 pts] $-4 + y$
4. ○ [0 pts] 0
5. ○ [0 pts] $-4 - y$

20. Which of the following are factors of $x^4 - 81$?

I. $x - 3$ II. $x + 3$ III. $x^2 + 9$

1. ○ [0 pts]III only
2. ○ [0 pts]I only
3. ○ [0 pts]II only
4. ○ [1 pts]I, II and III
5. ○ [0 pts]I and II only

21. If $f(x) = x^2 - 5$ and $g(x) = 3x + 1$, then $f(g(2)) =$

1. ○ [1 pts] 44
2. ○ [0 pts] -1
3. ○ [0 pts] -2
4. ○ [0 pts] -7
5. ○ [0 pts] 2

22. The graph of the system of equations $\begin{cases} x + 2y = 1 \\ 4x - 8y = 4 \end{cases}$ consists of

1. ○ [1 pts]two lines intersecting where x = 1.
2. ○ [0 pts]two lines intersecting where x = 4.
3. ○ [0 pts]two distinct parallel lines.
4. ○ [0 pts]two lines intersecting where y = 3.
5. ○ [0 pts]one line.

23. The inequality $x^2 - 5x - 6 < 0$ is equivalent to

1. ○ [1 pts] $-1 < x < 6$
2. ○ [0 pts] $x < -1$ or $x > 6$
3. ○ [0 pts] $x < 2$ or $x > 3$
4. ○ [0 pts] $-2 < x < 3$
5. ○ [0 pts] $2 < x < 3$

24. The distance between the points $(5, 2)$ and $(9, -1)$ is

1. ○ [0 pts] $\frac{4}{}$
2. ○ [1 pts] $\frac{5}{}$
3. ○ [0 pts] $\frac{25}{}$
4. ○ [0 pts] $\frac{7}{}$
5. ○ [0 pts] $\sqrt{17}$

25. The logarithmic form of $5^3 = 125$ is

1. ○ [0 pts] $log_5 3 = 125$
2. ○ [0 pts] $log_3 5 = 125$
3. ○ [0 pts] $log_{125} 5 = 3$
4. ○ [0 pts] $log_3 125 = 5$
5. ○ [1 pts] $log_5 125 = 3$

This is the end of Section I. Satisfactory completion of problems of the type in this section would qualify you to enroll in Math 1300, 1320, Math 1321, Math 1330, Math 1550 and/or Math 2300. If you plan, or may plan, to pursue a major which requires additional mathematics prerequisites, then you would need to continue on to Section II, otherwise you would stop here.

If you do **NOT** intend to proceed to Section II. of the sample examination, then at this point you may submit your responses and end the sample examination.

Initials: [ ] Required for exit confirmation

SUBMIT (Exit Examination)

Section II. The questions in this section measure preparation for Analytical Geometry (Math 1350), Calculus I (Math 1351) and Analytical Geometry and Calculus for Engineering Technology I (Math 2322).

Answer each question.

26. Which angle measured in radians best describes the angle whose degree measure is 105°?

1. [0 pts] $\frac{5}{12}\pi$
2. [0 pts] $\frac{12}{17}\pi$
3. [0 pts] $\frac{19}{12}\pi$
4. [0 pts] $\frac{17}{12}\pi$
5. [1 pts] $\frac{7}{12}\pi$

27. $cos(90^\circ - t)$ can be written as

1. [0 pts] $cos(t)$
2. [0 pts] $-sin(t)$
3. [0 pts] $1 - sin(t)$
4. [1 pts] $sin(t)$
5. [0 pts] $-cos(t)$

28. When the angle of inclination of the sun is 60°, the shadow cast by a tree is 12ft. How tall is the tree?

1. [0 pts] 6 ft
2. [0 pts] 12 ft
3. [0 pts] $4\sqrt{3}$ ft
4. [1 pts] $12\sqrt{3}$ ft
5. [0 pts] $6\sqrt{2}$ ft

29. If cos(t) = $-\frac{12}{13}$ and $180^\circ \leq t \leq 270^\circ$, then sin(t) =

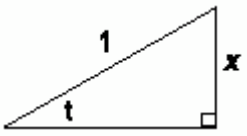
1. [0 pts] $-\frac{5}{12}$

2. [0 pts] $-\frac{1}{13}$
3. [0 pts] None of these
4. [1 pts] $-\frac{5}{13}$
5. [0 pts] $-\frac{11}{12}$

30. $sec^2(t)cot(t)cos(t)$ can also be written as

1. [0 pts] $sec(t)sin(t)$
2. [1 pts] $csc(t)$
3. [0 pts] $cos(t)$
4. [0 pts] $sec(t)$
5. [0 pts] $tan(t)$

31. In the right triangle shown to the right, cot(t) =



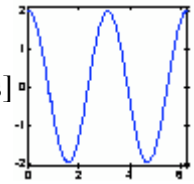
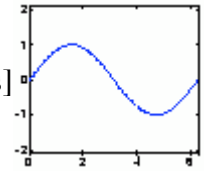
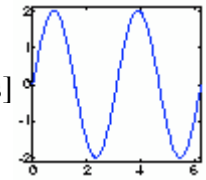
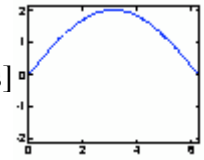
1. [0 pts] $\sqrt{1-x^2}$
2. [0 pts] insufficient information
3. [0 pts] $\frac{1}{\sqrt{1-x^2}}$
4. [0 pts] $\frac{1}{x}$
5. [1 pts] $\frac{\sqrt{1-x^2}}{x}$

32. If $0 < t < 90$ and $cos(t) = \frac{4}{5}$, then $cos(2t) =$

1. [0 pts] $\frac{3}{5}$

2. [0 pts] $\frac{1}{5}$
3. [0 pts] $\frac{24}{25}$
4. [1 pts] $\frac{7}{25}$
5. [0 pts] $\frac{1}{25}$

33. Which of the following figures best describes the graph of $y = 2sinx/2$?

1. [0 pts] 
2. [0 pts] None of these
3. [0 pts] 
4. [0 pts] 
5. [1 pts] 

34. The equation of a line passing through $(2, -1)$ and perpendicular to $2x + y - 3 = 0$ can be written as

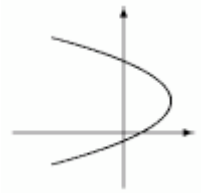
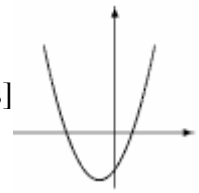
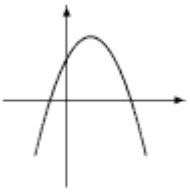
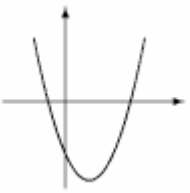
1. [0 pts] $x + 2y = 0$
2. [0 pts] $2x - y - 5 = 0$
3. [0 pts] $x - 2y - 1 = 0$

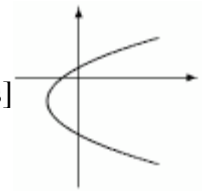
4. ○ [1 pts] $x - 2y - 4 = 0$
5. ○ [0 pts] $2x + y - 3 = 0$

35. Find the slope and y-intercept of the line passing through the points $(-2, 0), (3, 5)$.

1. ○ [1 pts]slope 1, y-intercept 2
2. ○ [0 pts]slope 2, y-intercept 1
3. ○ [0 pts]slope -1, y-intercept 2
4. ○ [0 pts]slope -1, y-intercept 1.5
5. ○ [0 pts]slope -1, y-intercept 8

36. Which figure best represents the graph $y = (x - 1)^2 - 3$?

1. ○ [0 pts] 
2. ○ [0 pts] 
3. ○ [0 pts] 
4. ○ [1 pts] 

5. ○ [0 pts] 

37. Find the center C and radius r of the circle $x^2 + y^2 - 8x + 16y + 55 = 0$.

1. ○ [0 pts] $r : \sqrt{55},\ C : (8, -16)$
2. ○ [0 pts] $r : 5, C : (-4, 8)$
3. ○ [0 pts] $r : 55, C : (-8, 16)$
4. ○ [1 pts] $r : 5, C : (4, -8)$
5. ○ [0 pts] $r : 25, C : (-4, 8)$

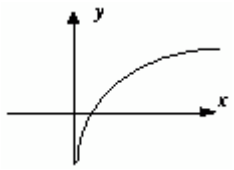
38. The graph of the equation $\frac{(x-2)^2}{2} + \frac{(y+1)^2}{4} = 1$ is best described by

1. ○ [0 pts]a hyperbola
2. ○ [0 pts]the point (2,1)
3. ○ [0 pts]a parabola
4. ○ [1 pts]an ellipse
5. ○ [0 pts]a circle

39. Using the properties of the log function, the expression $3log(2x) - 2log(2x^2)$ can be written as

1. ○ [0 pts] $\log(6x - 4x^2)$
2. ○ [1 pts] $\log\left(\frac{2}{x}\right)$
3. ○ [0 pts] $\log(2x)$
4. ○ [0 pts] $\frac{\log(8x^3)}{\log(4x^4)}$

5. [0 pts] $\log\left(\frac{3}{2x}\right)$

40. The figure to the right best depicts the graph of 

1. [0 pts] $y = \sqrt{x}$
2. [0 pts] $\log_{1/2}(x)$
3. [1 pts] $y = \log_2(x)$
4. [0 pts] $y = \left(\frac{1}{2}\right)^x$
5. [0 pts] $y = 2^x$

Initials: Required for exit confirmation

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