MDPT Practice Test 1 (Pre-Calculus)

1. What is the radian measure of an angle whose degree measure is 72°?
   a) $\frac{5}{2\pi}$  
   b) $\frac{2\pi}{5}$  
   c) $\frac{\pi}{5}$  
   d) $\frac{2}{5}$  
   e) $\frac{1}{5}$

2. In the figure to the right, $AB$ is the diameter of the circle with center $O$. If the length of $OC$ is 10 and the length of $BC$ is 16, what is the length of $AC$?

   a) 11  
   b) 20  
   c) 8  
   d) 10  
   e) 12

3. One solution to $z^2 + 64 = 0$ is
   a) $8i$  
   b) $-64$  
   c) 8  
   d) $64i$  
   e) $-8$

4. $\sqrt{36x^{10}y^{12} - 36y^{12}} =$
   a) $6x^5y^6$  
   b) $36x^5y^6 - 36y^6$  
   c) $6y^6\sqrt{x^{10} - 1}$  
   d) $36y^6\sqrt{x^{10} - 1}$  
   e) $6x^5y^6 - 6y^6$

5. $(27a^{-3}b^9c^6)^{1/3} =$
   a) $9ab^3c^2$  
   b) $3ab^3c^2$  
   c) $\frac{3b^3c^2}{a}$  
   d) $\frac{b^3c^2}{3a}$  
   e) $\frac{9b^3c^2}{a}$

6. If $\sin \theta = \frac{3}{5}$ and $0 \leq \theta \leq \frac{\pi}{2}$, then $\tan \theta =$
   a) $\frac{3}{2}$  
   b) $\frac{4}{3}$  
   c) $\frac{5}{4}$  
   d) $\frac{4}{5}$  
   e) $\frac{3}{4}$

7. $\frac{x^2 - 9}{x^2 - 1} \cdot \frac{(x + 1)^2}{(2x + 3)(x + 3)} \div \frac{2x - 6}{1 - x} =$
   a) $\frac{2(x - 3)^2(x + 1)}{(x - 1)^2(2x + 3)}$  
   b) $\frac{x + 1}{2(2x + 3)}$  
   c) $\frac{x + 1}{(x - 1)(2x + 3)}$  
   d) $-\frac{x + 1}{2(2x + 3)}$  
   e) none of the above
8. \[
\frac{\frac{1}{x-5} + \frac{11}{(x-5)^2}}{x+1} =
\]
\[\begin{align*}
a) & \frac{11}{(x-5)(x+1)} & \quad c) & \frac{12}{(x-5)^2(x+1)} \\
b) & \frac{x+6}{(x-5)^2(x+1)} & \quad d) & \frac{(x-6)(x+1)}{(x-5)^2} \\
\end{align*}\]

9. In the triangle \(ABC\) to the right, the length of \(AB\) is equal to the length of \(BC\). What is \(x\)?

[Diagram of a triangle with angles labeled]

\[\begin{align*}
a) & \ 233 \quad b) \ 3 \quad c) \ 33 \quad d) \ 12 \quad e) \ 30
\end{align*}\]

10. Which of the following can NOT be a root of the polynomial \(x^4 - 8x^3 - 19x^2 + 158x + 168\)?

\[\begin{align*}
a) & \ 7 \quad b) \ -4 \quad c) \ 6 \quad d) \ 1 \quad e) \ -1
\end{align*}\]

11. In the quadrilateral \(ABCD\), the diagonals \(AC\) and \(BD\) bisect each other and are perpendicular. Which of the following could be a description of \(ABCD\)?

\[\begin{align*}
I. \ & \text{a rectangle which is not a square} \\
II. \ & \text{a rhombus which is not a square} \\
III. \ & \text{a parallelogram which is not a rhombus} \\
IV. \ & \text{a square}
\end{align*}\]

\[\begin{align*}
a) & \ I,II,III, \text{ and} \quad b) \ II \text{ and III} \quad c) \ I \text{ and IV} \quad d) \ IV \text{ only} \quad e) \ II \text{ and IV}
\end{align*}\]

12. What is the distance between the points \((7, 8)\) and \((6, 1)\)?

\[\begin{align*}
a) & \ \sqrt{82} \quad b) \ \sqrt{48} \quad c) \ \sqrt{50} \quad d) \ \sqrt{218} \quad e) \ \sqrt{40}
\end{align*}\]

13. If \(16^x16^{x+12} = 16^{3x-4}\), then \(x = \)

\[\begin{align*}
a) & \ 8 \quad b) \ 16 \quad c) \ -\frac{2}{5} \quad d) \ \frac{-9 + \sqrt{65}}{2} \quad e) \ \frac{16}{3}
\end{align*}\]
14. In the figure to the right, the measures of the angles are given in degrees. What is the measure of angle $C$?

a) 115°  

b) 20°  

c) 110°  

d) 70°  

e) 55°  

15. \[
\frac{xy^2}{(3x^2y^{-1})^{-4}} = \]

a) \(\frac{81}{x^7y^8} \)  

b) \(\frac{1}{81x^7y^8} \)  

c) \(\frac{y^{6}}{81x^{7}} \)  

d) \(\frac{81x^{9}}{y^{2}} \)  

e) \(81x^{9}y^{6} \)  

16. \(\log_{b}c = 4 \) means

a) \(4^c = b \)  

b) \(b^4 = c\)  

c) \(c^4 = b\)  

d) \(b^c = 4\)  

e) \(4^b = 6\)  

17. The point \((3, -5)\) is reflected across the $x$-axis, then across the $y$-axis, then across the line $y = x$. What is the resulting point?

a) \((5, -3)\)  

b) \((-3, 5)\)  

c) \((5, 3)\)  

d) \((-3, -5)\)  

e) \((3, 5)\)  

18. \(-2|3 - x| - 5 \geq -7\) is equivalent to

a) \(x \leq 2\) and \(x \geq 4\)  

b) \(-4 \leq x \leq 2\)  

c) \(2 \leq x \leq 4\)  

d) \(x \leq -4\) and \(x \geq 2\)  

e) \(x \leq -4\) and \(x \geq 2\)  

19. \(\sqrt[3]{27x} \over \sqrt{81x} = \)

a) \(\sqrt[3]{3} \over \sqrt{x} \)  

b) \(\frac{1}{3} \)  

c) \(\sqrt[3]{3} \cdot \sqrt[3]{x} \)  

d) \(\frac{1}{3\sqrt{x}} \)  

e) \(\frac{\sqrt{x}}{3} \)  

20. \((cn^{3})^3 \cdot (-2c^{4}d)^4 = \)

a) \(-2c^{19}d^{13} \)  

b) \(16c^{9}d^{10} \)  

c) \(16c^{48}d^{36} \)  

d) \(-2c^{7}d^{7} \)  

e) \(16c^{19}d^{13} \)  

21. If \(\log_{11}(x + 4) = 2\log_{11}5\), then \(x = \)

a) \(6\)  

b) \(1\)  

c) \(25\)  

d) \(14\)  

e) \(21\)  

22. The inequality \(x^2 - 2x < 8\) is equivalent to which of the following?

a) \(x < 4\) or \(x > -2\)  

b) \(x < -4\) or \(x > 2\)  

c) \(-4 < x < 2\)  

d) \(-2 < x < 4\)  

e) \(x < 4\)
23. One root of $2x^2 - 2x - 1$ is

a) $\frac{-1 + \sqrt{3}}{2}$  

b) $\frac{1 - \sqrt{3}}{2}$  

c) $\frac{1 + \sqrt{5}}{2}$  

d) 1  

e) $\frac{1}{2}$

24. Leslie is in the center of a circular track of radius 60 feet watching Katrina and Jensine run a race. When Katrina wins, Leslie notices that the angle formed by drawing a line from the center of the track to Katrina and a line from the center of the track to Jensine measures $\frac{\pi}{6}$ radians. How far, in feet, behind Katrina is Jensine when Katrina wins?

a) 360  

b) $60\pi$  

 c) $10\pi$  

d) $\frac{\pi}{3}$  

e) $\frac{\pi}{6}$

25. Angle $ABC$ in the figure to the right is a right angle. What is $x$?

\[
\begin{align*}
A & \quad B \\
\quad & \quad C \\
\quad & \\
\quad & k \\
\quad & \\
\quad & \\
\quad & \\
\quad & 5 \\
\quad & \\
\quad & 11
\end{align*}
\]

a) 8  

b) $\sqrt{55}$  

 c) $\sqrt{96}$  

d) 55  

e) $\frac{5}{11}$

26. If $\log_2 (x^2 - 33) - \log_2 x = 3$, then $x =$

a) $\sqrt{41}$  

b) $\frac{1 + \sqrt{165}}{2}$  

 c) 11  

d) $-3$ and 11  

e) $\frac{1 \pm \sqrt{165}}{2}$

27. If $9^x = 3^{1-2x}$, then $x =$

a) $-\frac{1}{3}$  

b) $-\frac{1}{4}$  

 c) $\frac{1}{4}$  

d) $\frac{1}{3}$  

e) $\frac{1}{2}$

28. In the right triangle $ABC$ shown at the right, the length of $AB$ is 6 and the measure of angle $ACB$ is $x^\circ$. What is the length of $AC$?

\[
\begin{align*}
A & \quad B \\
\quad & \quad C \\
\quad & \\
\quad & x \\
\quad & \\
\quad & 6
\end{align*}
\]

a) $\frac{6}{\cos x}$  

b) $6 \cos c$  

 c) $\frac{6}{\sin x}$  

d) $\frac{\sin x}{6}$  

e) $6 \sin x$

29. \[\frac{y}{x + 5y} - \frac{4}{9x - 13} =\]

a) \[\frac{y - 4}{9x^2 + 45xy - 13x - 65y}\]

b) \[\frac{9xy + 7y - 4x}{9x^2 + 45xy - 13x - 65y}\]

c) \[\frac{9xy - 33y - 4x}{9x^2 + 45xy - 13x - 65y}\]

d) \[\frac{9xy + 7y + 4x}{9x^2 + 45xy - 13x - 65y}\]

e) \[\frac{y - 4}{-8x + 5y - 13}\]
30. The inequality $x^2 + 8x > -12$ is equivalent to

a) $x > 6$ or $x > 2$  

b) $x < -6$ or $x < -2$  

c) $-6 < x < -2$  

d) $2 < x < 6$  

e) $x < -6$ and $x < -2$

31. If $\log_5 x - \log_5 (x + 2) = \log_5 11$, then $x =$

a) $-2 + \sqrt{48}$  

b) $\frac{9}{2}$  

c) $-\frac{11}{5}$  

d) $-\frac{1}{5}$  

e) No solution

32. A circle has circumference $12\pi$. What is the area of the circle?

a) $36\pi$  

b) $144\pi$  

b) $6\pi$  

d) $12\pi$  

e) $6\pi^2$

33. Katrina has a circular garden plot of area $A$ square feet. If she increases the diameter by a factor of 2, what is the area of her new garden?

a) $2A$  

b) $2A^2$  

b) $4A^2$  

d) $(A + 2)^2$  

e) $4A$

34. If $f(x) = 7x^2 - x + 2$, then $f(c - 4) =$

a) $7c^2 - 57c + 118$  

b) $7c - 9c + 22$  

b) $7c^2 - 55c + 118$  

d) $7c^2 - 57c + 110$

e) $7c^2 - c - 2$

35. Lines $l_1$ and $l_2$ are parallel. Line $l_3$ is perpendicular to $l_2$. Which of the following is NOT true?

a) Line $l_3$ is perpendicular to $l_1$.  

b) If line $l_4$ is perpendicular to $l_3$, then $l_4$ is parallel to $l_1$.  

c) If line $l_4$ is parallel to $l_3$, then $l_4$ is parallel to $l_1$.  

d) Line $l_1$ intersects $l_3$.  

e) If line $l_4$ is not perpendicular to $l_3$, then $l_4$ intersects $l_2$.

36. In the figure at the right, the length of $AC$ is 12, the length of $DE$ is 9, the length of $BC$ is 20, and the segments $DE$ and $AC$ are parallel. What is the length of $EC$?

a) 5  

b) 15  

b) 8  

d) 7  

e) 4