

**Practice MDPT 9**

**Problem 1.**

(1 pt) The inequality  $x^2+8x+12 < 0$  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  $x > -2$

**Problem 2.**

(1 pt) One factor of  $x^4 - 34x^2 - 72$  is

- A.  $x-2$                       B.  $x^2+36$                       C.  $x+2$                       D.  $x-6$                       E.  $x^2-2$

**Problem 3.**

(1 pt) If  $\log_{23}(x+8) = \log_{23} 3(32x) - \log_{23} 3(16)$ , then  $x =$

- A. 8                      B.  $\frac{8}{511}$                       C. 16                      D.  $\frac{8}{15}$                       E.  $\frac{24}{31}$

**Problem 4.**

(1 pt)  $\frac{x^2 - 2x - 24}{x^2 - 12x + 36} =$

- A.  $\frac{x+4}{x-6}$                       B.  $\frac{-4x-24}{-6x+36}$                       C.  $\frac{x+4}{x-6}$                       D.  $\frac{x-4}{x-6}$                       E.  $\frac{-2x-24}{-12x+36}$

**Problem 5.**

(1 pt)  $b - \frac{a}{6} =$

- A.  $\frac{b-a}{6b}$                       B.  $\frac{6b-a}{6b}$                       C.  $\frac{a-b}{5}$                       D.  $\frac{b-a}{6}$                       E.  $\frac{6b-a}{6}$

**Problem 6.**

(1 pt) If  $16^x 16^{x+12} = 16^{3x-4}$ , then  $x =$

- A. 8      B. 16      C.  $\frac{-2}{5}$       D.  $\frac{-9 + \sqrt{65}}{2}$       E.  $\frac{16}{3}$

**Problem 7.**

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

- I. a rectangle which is not a square
- II. a rhombus which is not a square
- III. a parallelogram which is not a rhombus
- IV. a square

- A. I, II, III, and IV      B. II and III      C. I and IV      D. IV only      E. II and IV

**Problem 8.**

(1 pt) A circle has circumference  $16\pi$ . What is the area of the circle?

- A.  $82\pi^2$       B.  $64\pi$       C.  $256\pi$       D.  $8\pi$       E.  $16\pi$

**Problem 9.**

(1 pt) If  $8 + \sqrt{x+14} = 12$ , then  $x =$

- A. -10      B. 30      C. 2      D. 66      E. -4

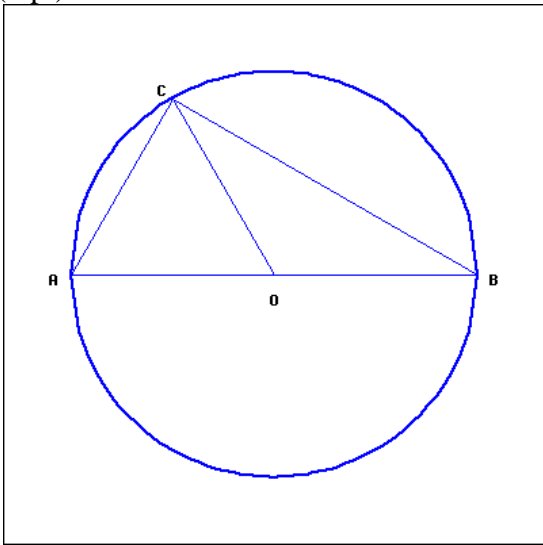
**Problem 10.**

(1 pt) Amy has a square garden plot of area  $A$  square feet. If she decides to expand her garden by doubling the length of each side, what is the area of her new garden?

- A.  $2A$       B.  $4A^2$       C.  $2A^2$       D.  $(A+2)^2$       E.  $4A$

**Problem 11.**

(1 pt)



In the picture above [click to enlarge], AB is a diameter of the circle with center O . If the length of AC is 6 and the length of BC is 8, what is the length of OC ?

- A. 20      B. 10      C. 8      D. 6      E. 5

**Problem 12.**

(1 pt)  $\frac{c^4 y^2}{(3xy^2)^2} =$

- A.  $\frac{x^6}{9y^6}$       B.  $\frac{9x^3}{y^2}$       C.  $\frac{x^2}{9y^2}$       D.  $\frac{x^2}{9y^{-2}}$       E.  $9x^2y^2$

**Problem 13.**

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

- A.  $7c^2 - 57c + 118$       B.  $7c^2 - 9c + 22$       C.  $7c^2 - 55c + 118$       D.  $7c^2 - 57c + 110$   
 E.  $7c^2 - c - 2$

**Problem 14.**

(1 pt) If  $\log_3(x+10)=2\log_3(5)$ , then  $x=$

- A. -5      B. 15      C. 0      D. 20      E. 25

**Problem 15.**

(1 pt) If  $-6+\sqrt{x+12}=17$ , then  $x=$

- A. 31      B. 517      C. 541      D. 11      E. 241

**Problem 16.**

(1 pt) Lines 1 and 2 are parallel. Line 3 is perpendicular to 2. Which of the following is NOT true?

- A. If line 4 is not perpendicular to line 3, then 4 intersects 2.  
B. Line 3 is perpendicular to 1.  
C. If line 4 is perpendicular to 3, then 4 is parallel to 1.  
D. If line 4 is parallel to line 3, then 4 is parallel to 1.  
E. Line 1 intersects 3.

**Problem 17.**

(1 pt) One root of  $-5x^2+6x+10$  is

- A.  $\frac{-6+\sqrt{236}}{-10}$       B.  $\frac{6-\sqrt{236}}{-10}$       C.  $\frac{-6-\sqrt{236}}{2}$       D.  $\frac{6+\sqrt{236}}{-10}$       E.  $\frac{-6+\sqrt{164}}{-10}$

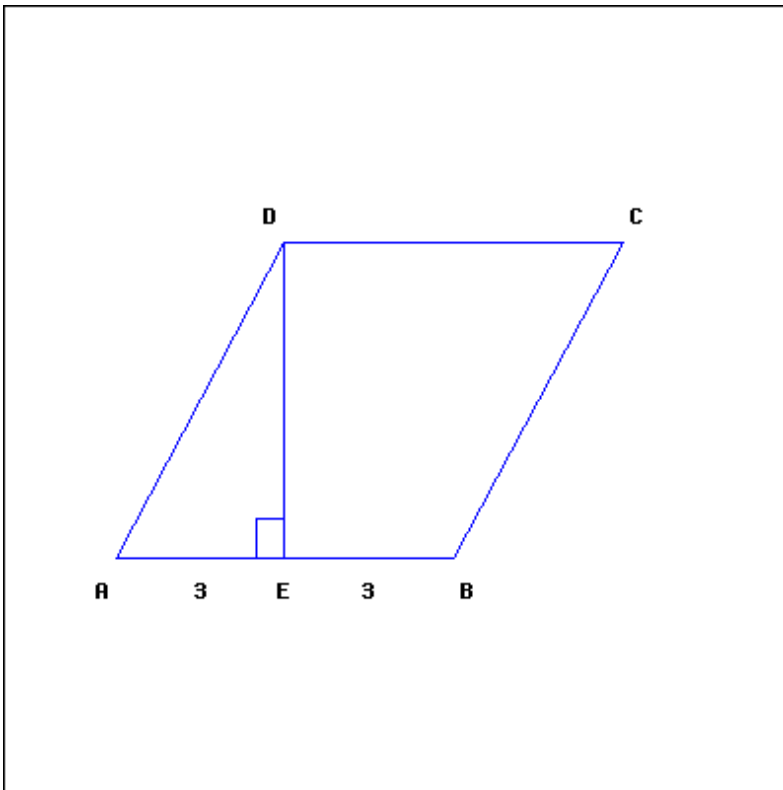
**Problem 18**

(1 pt)  $x^{-5}=$

- A.  $5x$       B.  $x^5$       C.  $\sqrt[5]{x}$       D.  $\frac{1}{\sqrt[5]{x}}$       E.  $\frac{1}{x^5}$

**Problem 19.**

(1 pt)



In the parallelogram pictured above [click to enlarge],  $AB$  is perpendicular to  $DE$ . If the area of the parallelogram is 24, what is the length of  $AD$ ?

A.  $\frac{\sqrt{657}}{3}$

B. 4

C.  $\frac{\sqrt{657}}{2}$

D. 5

E. 6

**Problem 20**

(1 pt) Which of the following can NOT be a root of the polynomial  $x^4 - 6x^3 - 37x^2 + 138x + 504$ ?

A. 3

B. 6

C. -3

D. 7

E. -4

**Problem 21.**

$$(1 \text{ pt}) \left( \frac{b^8}{4a^3} \right) \cdot \left( \frac{a^3 + a^4}{4b^{13}} \right) =$$

A.  $\frac{a}{16b}$

B.  $\frac{a+1}{16b^5}$

C.  $\frac{b^{21}}{a^3(a^3 + a^4)}$

D.  $\frac{b^5(a+1)}{16}$

E.  $\frac{a^4}{16b^5}$

**Problem 22.**

(1 pt) Karen is in the center of a circular track of radius 60 feet watching Abigail and Mercury run a race. When Abigail wins, Karen notices that the angle formed by drawing a line from the center of the track to Abigail and a line from the center of the track to Mercury measures  $\frac{\pi}{4}$  radians. How far, in feet, behind Abigail is Mercury when Abigail wins?

A.  $60 \pi$

B.  $\frac{\pi}{2}$

C.  $15 \pi$

D.  $\frac{\pi}{4}$

E. 240

**Problem 23.**

(1 pt) What is the distance between the points  $(-3, -2)$  and  $(-8, 1)$ ?

A.  $\sqrt{26}$

B.  $\sqrt{34}$

C.  $\sqrt{130}$

D.  $\sqrt{16}$

E.  $\sqrt{52}$

**Problem 24.**

$$(1 \text{ pt}) \frac{x^2 - x - 100}{x^2 - 10x - 11} =$$

A.  $\frac{x-110}{x+11}$

B.  $\frac{x+10}{x+1}$

C.  $\frac{x+110}{x-11}$

D.  $\frac{x-10}{x-1}$

E.  $\frac{x-10}{x-1}$

**Problem 25**

$$(1 \text{ pt}) \left( \frac{x^2 + 11x - 26}{x - 11} \right) \cdot \left( \frac{x^2 - 11x}{x^2 + x - 6} \right) =$$

- A.  $\frac{x+13}{x+3}$       B.  $\frac{x(x+13)}{x+3}$       C.  $\frac{-(x-2)(x+13)}{(x-11)(x-6)}$       D.  $\frac{x+13}{x(x+3)}$       E.  $\frac{x(x-13)}{x+3}$

**Problem 26**

(1 pt) A point is in quadrant III of the  $xy$ -plane. The point is reflected across the  $y$ -axis, across the  $x$ -axis, and then again across the  $y$ -axis. In what quadrant is the resulting point?

- A. I      B. II      C. IV      D. III      E. None of the above

**Problem 27.**

$$(1 \text{ pt}) \frac{x^2 - 4x - 117}{x^2 - 25x + 156} =$$

- A.  $\frac{x+9}{x-3}$       B.  $\frac{x-9}{x-12}$       C.  $\frac{-9x-117}{-12x+156}$       D.  $\frac{-4x-117}{-25x+156}$       E.  $\frac{x+9}{x-12}$

**Problem 28**

$$(1 \text{ pt}) \frac{x^8 y^8}{(3xy^2)^6} =$$

- A.  $\frac{x^2}{729y^4}$       B.  $729x^2y^4$       C.  $\frac{729x^7}{y^4}$       D.  $\frac{x^{14}}{729y^{20}}$       E.  $\frac{x^2}{729y^{-4}}$

**Problem 29**

(1 pt) What number must be added to  $x^2+3x$  to complete the square?

- A.  $\frac{9}{4}$       B. 6      C.  $\frac{3}{2}$       D. 9      E.  $\frac{9}{2}$

**Problem 30**

(1 pt)

In the parallelogram pictured above [click to enlarge], AB is perpendicular to DE . If the area of the parallelogram is 152 , what is the length of AD ?

- A.  $\frac{\sqrt{73729}}{15}$       B.  $\frac{\sqrt{26704}}{4}$       C. 17      D. 19      E. 8

**Problem 31**(1 pt) If  $8^x 8^{x+15} = 8^{3x-4}$  , then x=

- A. 11      B.  $\frac{19}{3}$       C.  $\frac{-4}{13}$       D.  $\frac{-12 + \sqrt{128}}{2}$       E. 19

**Problem 32.**(1 pt) If  $f(x) = 6x^2 - x + 2$  , then  $f(c-7) =$ 

- A.  $6c^2 - 83c + 303$       B.  $6c^2 - 85c + 289$       C.  $6c^2 - 85c + 303$       D.  $6c^2 - 15c + 58$   
E.  $6c^2 - c - 5$

**Problem 33.**

(1 pt) What is the distance between the points (7, -4) and (4, 3) ?

- A.  $\sqrt{40}$       B.  $\sqrt{170}$       C.  $\sqrt{80}$       D.  $\sqrt{58}$       E.  $\sqrt{10}$

**Problem 34**(1 pt) One factor of  $x^4 + 17x^2 + 72$  is

- A.  $x^2 - 9$       B.  $x^2 + 9$       C.  $x + 8$       D.  $x + 9$       E.  $x - 8$

**Problem 35.**

(1 pt)  $\sqrt{49x^4y^8 - 49y^8} =$

A.  $7x^2y^4$

B.  $7x^2y^4 - 7y^4$

C.  $7y^4\sqrt{x^4 - 1}$

D.  $49x^2y^4 - 49y^4$

E.  $49y^4\sqrt{x^4 - 1}$