

## General and Intermediate Mathematics Placement Tests

### SAMPLE PROBLEMS

This booklet contains sample problems for the General and Intermediate Mathematics Placement Tests (MPT-G and MPT-I) offered by the Academic Placement Testing Program (APTP). The collection is NOT intended to serve as a practice test but only to provide test takers with an idea of the content and difficulty of the MPT-G and MPT-I. The correct answers to the problems are shown on the last page of the booklet.

The General Mathematics Placement Test (MPT-G) was developed to cover College Readiness Mathematics Standards (CRMS) 4-8 as developed by the Transition Mathematics Project (TMP):

- |                             |              |
|-----------------------------|--------------|
| 4. Number Sense             | 7. Algebra   |
| 5. Geometry                 | 8. Functions |
| 6. Probability / Statistics |              |

The Intermediate Mathematics Placement Test (MPT-I) was developed to cover the following selected topics:

- |                            |                                |
|----------------------------|--------------------------------|
| Absolute Value             | Inequalities                   |
| Basic Algebraic Operations | Linear Graphs and Functions    |
| Exponents and Roots        | Proportions                    |
| Factoring                  | Quadratic Graphs and Functions |
| Functional Notation        | Simplifying                    |
| Geometry                   | Systems of Equations           |
| Graph Interpretation       |                                |



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1.  $25x^2 - y^2 =$

a.  $(5x - y)^2$

b.  $(5x - y)(5x + y)$

c.  $25(x - y)(x + y)$

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2. If  $f(x) = x^2 - 5x + 12$ , then  $f(3) =$

a. 6

b. 9

c. 36

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3.  $\frac{z^3}{4} \cdot \frac{8}{y^4} \cdot \frac{y^8}{10z^9} =$

a.  $\frac{y^2}{5z^3}$

b.  $\frac{y^4}{5z^6}$

c.  $\frac{5y^2}{z^3}$

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4. If  $x = \frac{1}{3}x + 6$  then  $x =$

a. -4

b. 9

c. 18

---

5. The inequality  $4 - 3x > 10$  is equivalent to:

a.  $x < -2$

b.  $x < -\frac{14}{3}$

c.  $x > -2$

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6.  $(5a - 3)^2 =$

a.  $25a^2 + 9$

b.  $25a^2 - 15a + 9$

c.  $25a^2 - 30a + 9$

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7.  $\sqrt[5]{x^3} =$

a.  $x^{-2}$

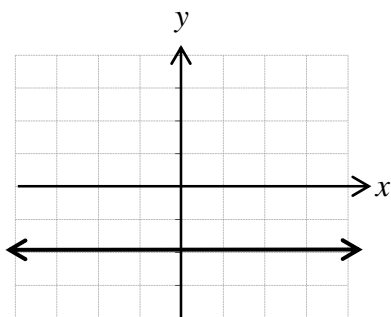
b.  $x^{\frac{3}{5}}$

c.  $x^{15}$

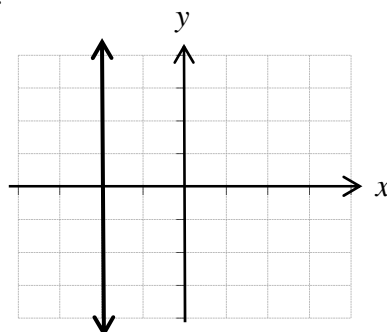
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8. Which of the following could be a portion of the graph of  $y = -2$ ?

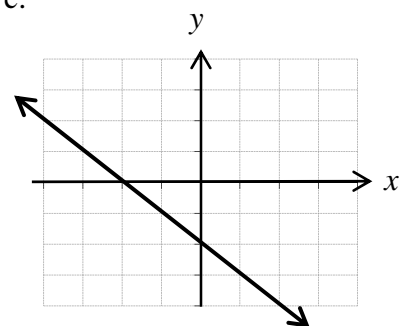
a.



b.



c.



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9. If  $c = -2$ , then  $|2 - c| - |-3c| =$

a.  $-6$

b.  $-2$

c.  $10$

---

10.  $\frac{15.6 \times 10^2}{5.2 \times 10^6} =$

a.  $3.0 \times 10^{-4}$

b.  $3.0 \times 10^{-3}$

c.  $3.0 \times 10^4$

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11. What is the value of  $y$  in the system of equations  $2x - y = 4$

$x + y = 11$

a.  $-6$

b.  $5$

c.  $6$

---

12.  $\sqrt{6}\sqrt{15} =$

a.  $\sqrt{21}$

b.  $3\sqrt{10}$

c.  $10\sqrt{3}$

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13.  $(5x^3y^3)^2(x^{-1}y^{-3}) =$

a.  $5x^3y^3$

b.  $25x^3y^2$

c.  $25x^5y^3$

---

14.  $\frac{3^{-5}}{3^{-8}} =$

a.  $-\frac{1}{27}$

b.  $\frac{1}{27}$

c.  $27$

---

15. Which of the following is an equation of a line with slope 5 and  $y$ -intercept  $-2$ ?

a.  $y = -2x + 5$

b.  $y = \frac{x-2}{5}$

c.  $y = 5x - 2$

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16.  $(27x^6)^{\frac{2}{3}} =$

a.  $3\sqrt{3}x^4$

b.  $9x^4$

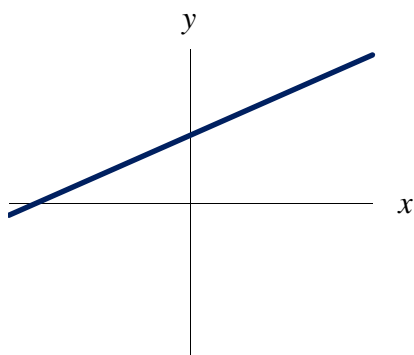
c.  $18x^9$

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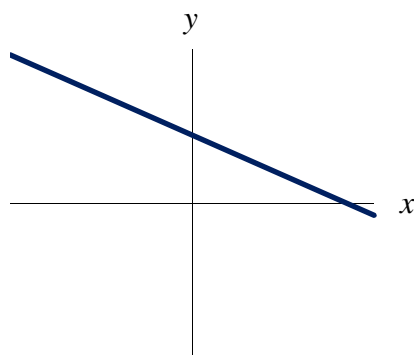
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17. Which of the following could be a portion of the graph of  $2x + 3y = 12$ ?

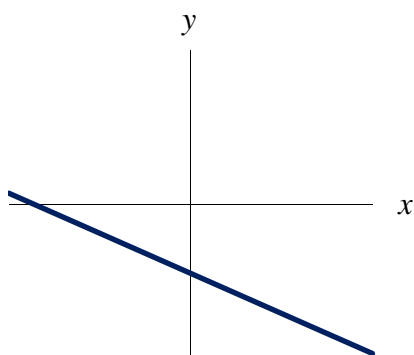
a.



b.



c.



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18. A person who bought 90 peaches took 30% of the store's peaches. How many peaches did the store have left?

a. 27

b. 210

c. 300

---

19.  $\frac{a}{b} + \frac{1}{2} =$

a.  $\frac{2a+b}{2b}$

b.  $\frac{a+2b}{2b}$

c.  $\frac{2a+b}{b+2}$

---

20.  $\frac{a^{x+2}}{a^5} =$

a.  $\frac{x+2}{5}$

b.  $a^{x-3}$

c.  $a^{x+\frac{2}{5}}$

---

21. 50 is what percent of 40?

a. 80%

b. 120%

c. 125%

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22.  $5x - 3[4(x - y) + 6x] =$

a.  $-x - 4y$

b.  $-13x - 12y$

c.  $-25x + 12y$

---

23.  $\frac{a}{b} + \frac{b}{a} =$

a.  $\frac{a^2 - b^2}{b + a}$

b.  $a^2 + b^2$

c.  $\frac{a^2 + b^2}{ba}$

---

24.  $x^{\frac{1}{2}}x^{\frac{1}{6}} =$

a.  $x^{\frac{1}{12}}$

b.  $x^{\frac{1}{8}}$

c.  $x^{\frac{2}{3}}$

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25. If  $9^{3x} = 3$ , then  $x =$

a.  $\frac{1}{9}$

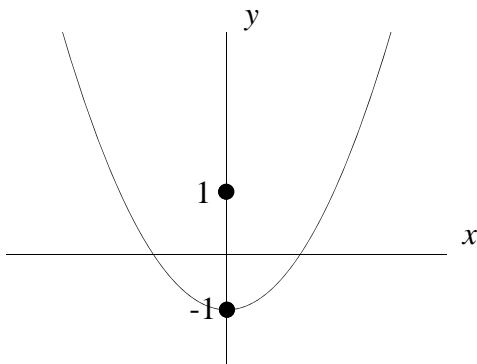
b.  $\frac{1}{6}$

c.  $\frac{1}{3}$

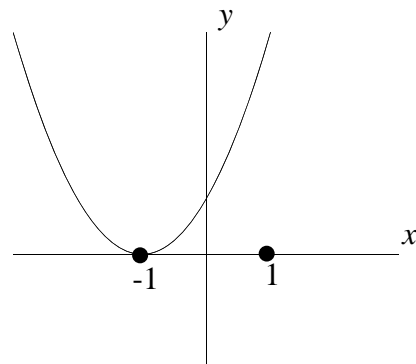
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26. Which of the following could be a portion of the graph of  $y = (x + 1)^2$ ?

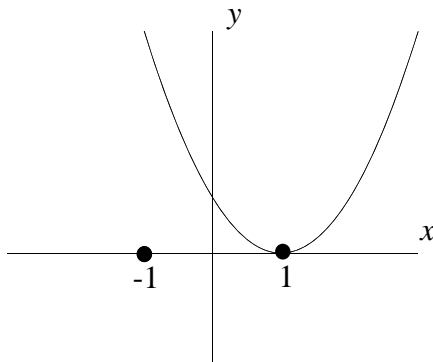
a.



b.



c.



---

27. If the sum of two numbers is 20 and one of those numbers is three times the other, what is the smaller number?

a. 5

b.  $\frac{20}{3}$

c. 15

---

28. If  $y = 3x - 2$ , then  $x =$

a.  $\frac{1}{3y-2}$

b.  $\frac{y+2}{3}$

c.  $\frac{1}{3}y + 2$

---

29. If  $f(x) = x^2 - 2x + 4$ , then  $f(a-1) =$

a.  $a^2 - 2a + 5$

b.  $a^2 - 4a + 3$

c.  $a^2 - 4a + 7$

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30.  $\sqrt{25a^2 + 25b^2} =$

a.  $5\sqrt{a^2 + b^2}$

b.  $5a + 5b$

c.  $5ab$

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31. The distance between the points  $(-1,5)$  and  $(6,-3)$  is:

a.  $\sqrt{29}$

b.  $\sqrt{113}$

c. 15

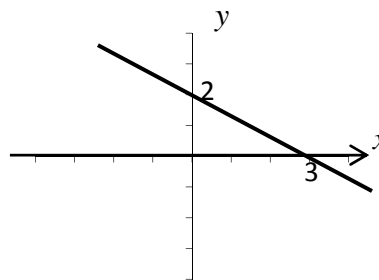
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32. What is the slope of the line in the figure at the right?

a.  $-3/2$

b.  $-2/3$

c. 2



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33. The length of each side of a square with area 1600 square inches is increased by 20 inches. What is the resulting area?

a. 2000

b. 3600

c. 64,000

---

34. If  $\sqrt{5x-4} = 4$ , then  $x =$

a.  $\frac{2\sqrt{2}}{5}$

b.  $\frac{8}{5}$

c. 4

---

35. If 4 pounds of apples cost  $M$  cents, then 10 pounds of apples costs:

a.  $0.4M$  cents

b.  $2.5M$  cents

c.  $4M$  cents

---

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

a.  $\frac{x+1}{x-3}$

b.  $\frac{x^2 + 1}{x(x-3)}$

c.  $\frac{x^2 + x - 3}{x(x-3)}$

---

37.  $\frac{a^2 - b^2}{\frac{1}{a} - \frac{1}{b}} =$

a.  $a - b$

b.  $a^3 - b^3$

c.  $-ab(a + b)$

---

38. If  $x^2 + 10x - 5 = 0$ , then  $x =$

a.  $\frac{-10 \pm \sqrt{80}}{2}$

b.  $\frac{-10 \pm \sqrt{120}}{2}$

c.  $\frac{10 \pm \sqrt{120}}{2}$

---

39.  $\frac{x^2 - 25}{5(x+5)} \cdot \frac{x}{x-5} =$

a.  $\frac{x}{5}$

b.  $\frac{x}{x+5}$

c.  $\frac{x(x-5)}{5(x+5)}$

---

40. A factor of  $5y^2 + 13y - 6$  is:

a.  $y + 3$

b.  $5y + 2$

c.  $y^2 - 2$

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41.  $\sqrt{4s^2 + 16t^2} =$

a.  $2\sqrt{s^2 + 4t^2}$

b.  $4(s + 4t)$

c.  $(2s + 4t)(2s + 4t)$

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42. A chemist has to mix two chemicals, A and B, to make 150 grams of a solution. This solution requires 10 grams of A for every gram of B. If the amount of chemical A is designated as  $x$  and the amount of Chemical B is designated  $y$ , which of the following pairs of equations will allow the chemist to determine how much of each chemical she will need?

a.  $x + y = 150$   
 $x = 10y$

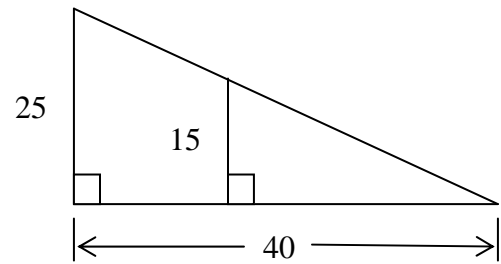
b.  $x + 10y = 150$   
 $y + 10x = 150$

c.  $x + y = 150$   
 $y = 10x$



43. The base of the triangle below is bisected to create two triangles, one small and one large. The height of the smaller triangle is 15 cm and the height of the larger triangle is 25. The base of the larger triangle is 40 cm. What is the length of the base of the smaller triangle?

- a. 24 cm
- b. 30 cm
- c. 36 cm



44. A bag is filled with marbles,  $\frac{1}{4}$ <sup>th</sup> of which are green and the rest are yellow. One-fourth of the green marbles are striped and  $\frac{1}{2}$  of the yellow marbles are striped. What fraction of the marbles in the bag are striped?

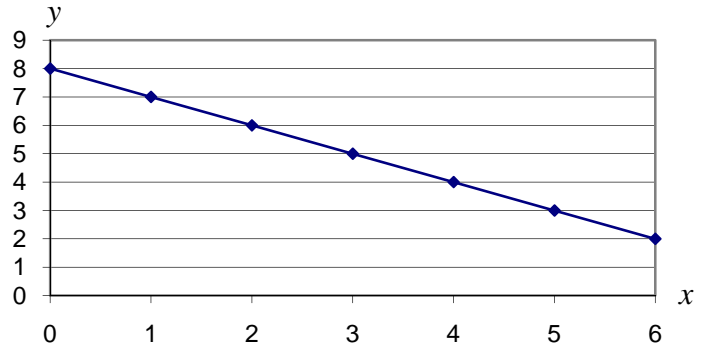
- a.  $\frac{3}{8}$
- b.  $\frac{7}{16}$
- c.  $\frac{3}{4}$

45. Betty wished to build a rectangular dog run along the side of her garage. The garage will serve as one of the longer sides of the run. If she has 50 feet of fencing and wishes the run to be 3 times longer than it is wide, how many square feet will the fencing enclose?

- a.  $117 \frac{1}{8}$  sq ft
- b. 250 sq ft
- c. 300 sq ft

46. What are the slope and the y-intercept of the graph at the right?

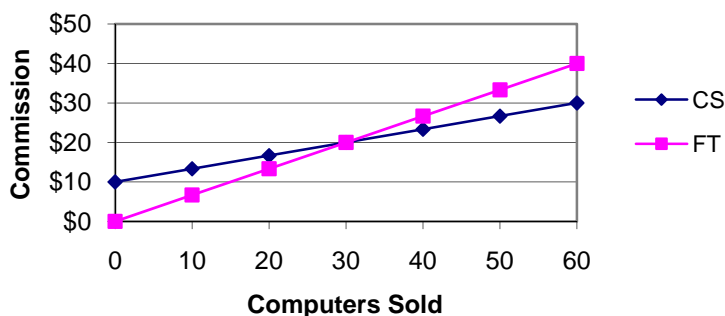
- a. slope =  $-\frac{1}{2}$ , y-intercept = 8
- b. slope = -1, y-intercept = 8
- c. slope = 8, y-intercept = 1



47. Barb is building a bookcase. She wants the bookcase to be 5 feet tall and 12 feet wide and have corners with 90 degree angles. To make the bookcase more rigid, she will place a brace from the upper right corner to the lower left corner. How long will the brace be?

- a. 13 feet
- b. 14 feet
- c. 17 feet

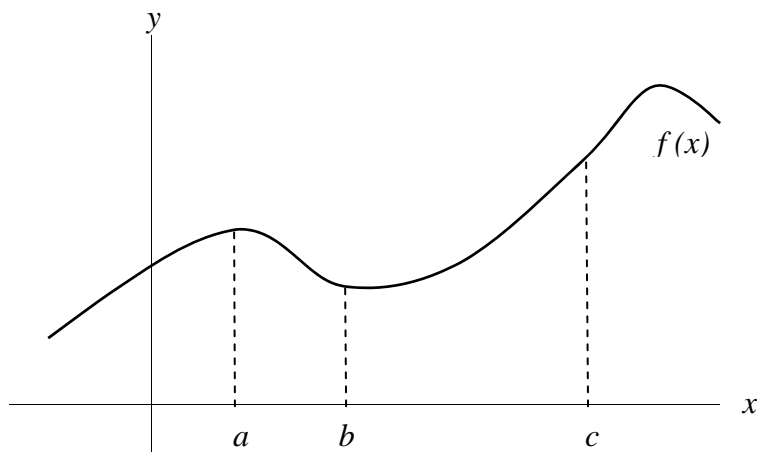
48. The graph below represents the amount of commission computer sales staff earn from two companies, Fast Track (FT) and Computer Store (CS). Which of the following statements is always true?



- a. Sales staff earn more commission at Fast Track.  
 b. If sales staff sell fewer than 30 computers they will earn more commission at Computer Store.  
 c. If sales staff sell 60 computers they will earn more commission at Computer Store.
49. Lisa is constructing rectangular picture frames and she wants the ratio of height to width to be 5 to 8. If she has a 65 inch length of picture frame molding, and she wants to use all of it for one frame, what equations should she use to determine the height,  $H$ , and width,  $W$ , of the frame?

- a.  $H + W = 65$   
 $8H - 5W = 0$
- b.  $2(H + W) = 65$   
 $5H = 8W$
- c.  $2(H + W) = 65$   
 $8H = 5W$

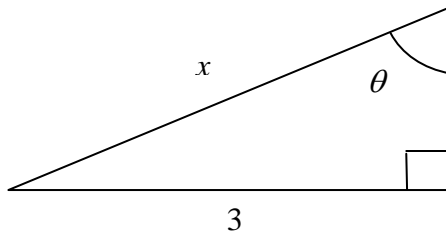
50. Suppose that the graph of  $y = f(x)$  looks like the one below. Which of the following is true?



- a.  $f(c) < f(a)$
- b.  $f(a) < f(b)$
- c.  $f(b) < f(c)$
51. A wheel has a diameter of 23 inches. Approximately how far will it roll in 2 revolutions?
- a. 6 feet
- b. 12 feet
- c. 72 feet

---

52. If  $\sin(\theta) = \frac{3}{4}$  in the right triangle below, then  $\cos(\theta) =$



a.  $\frac{\sqrt{3}}{4}$

b.  $\frac{\sqrt{7}}{4}$

c.  $\frac{4}{5}$

---

53. Five students are lining up to give speeches. One student must go first as he has to leave early. How many different speech orders are possible?

a. 16

b. 4!

c. 25

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54. Anna, Li, and Juan eat lots of apples. Last Thursday the mean number of apples they ate was 5. If Anna ate 3 and Juan ate 8, how many did Li eat?

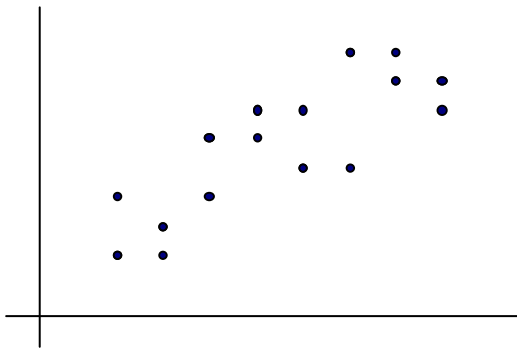
a. 2

b. 4

c. 5

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55. Which type of model best describes the scatter plot below?



a. asymptotic

b. exponential

c. linear with a positive slope

## CORRECT ANSWERS

- |       |       |       |
|-------|-------|-------|
| 1. b  | 21. c | 41. a |
| 2. a  | 22. c | 42. a |
| 3. b  | 23. c | 43. a |
| 4. b  | 24. c | 44. b |
| 5. a  | 25. b | 45. c |
| 6. c  | 26. b | 46. b |
| 7. b  | 27. a | 47. a |
| 8. a  | 28. b | 48. b |
| 9. b  | 29. c | 49. c |
| 10. a | 30. a | 50. c |
| 11. c | 31. b | 51. b |
| 12. b | 32. b | 52. b |
| 13. c | 33. b | 53. b |
| 14. c | 34. c | 54. b |
| 15. c | 35. b | 55. c |
| 16. b | 36. b |       |
| 17. b | 37. c |       |
| 18. b | 38. b |       |
| 19. a | 39. a |       |
| 20. b | 40. a |       |