Mathematics Placement Test
Practice Problems
Section I

The following questions are a sample of the types of problems you might see on the Mathematics Placement Test. **Calculators are not permitted for the test.**

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1. Express $\frac{5}{2} \times \left(\frac{1}{11} - \frac{1}{2}\right)$ as a single fraction. $\frac{5}{2}\left(\frac{2-11}{22}\right) = \frac{-5 \cdot 9}{44} = \boxed{-\frac{45}{44}}$

2. Is $\frac{3}{5} < \frac{2}{3} < \frac{8}{14}$ true? $\frac{9}{10} \overset{?}{<} \frac{10}{9}$ ✓ $\frac{28}{24} \overset{?}{<} \frac{24}{28}$ No

3. Factor the expression $3x^2 + 5x - 2$. $\boxed{(3x-1)(x+2)}$

4. Simplify the expresssion $\sqrt{\frac{18x^5}{z^2}}$. $\boxed{3\frac{x^2}{z}\sqrt{2x}}$

5. Expand $4(s+2)$. $\boxed{4s+8}$

6. If $x - 1 = 2$, then what is $x + 1$? $x - 1 = 2 \Rightarrow x = 3 \Rightarrow \boxed{x + 1 = 4}$

7. If $x = 3$, then what is $x^2 + 3$? $3^2 + 3 = \boxed{12}$

8. Simplify the expression $13a - 15b - a + 2b$. $(13a - a) - (15b - 2b) = \boxed{12a - 13b}$

9. If $x = -4$ and $y = -7$, then what is $x - y$?

$x - y = (-4) - (-7) = -4 + 7 = \boxed{3}$

10. Simplify $\frac{(-2)(-6)}{-4}$. $\frac{12}{-4} = \boxed{-3}$

11. Simplify $4-(-2+5)$. $4-(-2)-5 = -1+2 = \boxed{1}$

12. Simplify $(10)\left(\frac{1}{5}\right)(-2)(3)$. $= (2)(-6) = \boxed{-12}$

13. Solve for p in the following inequality: $3p > p+12$. $\Rightarrow \quad 2p > 12 \Rightarrow \boxed{p > 6}$

14. Simplify the following expression $(2x+3)-(x-2)$. $2x+3-x+2 = \boxed{x+5}$

15. If $\frac{1}{3}$ of a number is 8, then what is $\frac{1}{4}$ of the number? $\frac{1}{3}x = 8 \Rightarrow x = 24$
$\Rightarrow \frac{1}{4}x = \boxed{6}$

16. Given that $ax+b=3$ and $a \neq 0$, solve for x. $ax+b=3 \Rightarrow \boxed{x = \frac{3-b}{a}}$

17. Simplify $\frac{2x}{3y} \cdot \frac{9y}{4x^2}$. $= \boxed{\frac{3}{2x}}$

18. Determine the slope of the line that passes through the points $(1,1)$ and $(-3,-2)$. slope $= \frac{-2-1}{-3-1} = \frac{-3}{-4} = \boxed{\frac{3}{4}}$

19. Factor the expression $2x^2-7x+6$. $\boxed{(2x-3)(x-2)}$

20. Factor the expression x^2-81. $\boxed{(x-9)(x+9)}$

21. Simplify $(-2x^2)(3x^2y)(-y)$. $= \boxed{6x^4y^2}$

22. Simplify $(2x^5y^2)^2$. $\boxed{4x^{10}y^4}$

23. Simplify $\frac{y}{x^3} \div \frac{y^3}{x}$. $\frac{y/x^3}{y^3/x} = \frac{y}{y^3} \cdot \frac{x}{x^3} = \boxed{\frac{1}{x^2y^2}}$

24. If the sum of three numbers is 65 and one of the numbers is x, what is the sum of the other two? $x + y = 65 \Rightarrow y = \boxed{65 - x}$

25. Factor the expression $x^2 + x - 12$. $\boxed{(x - 3)(x + 4)}$

26. Factor the expression $xy^4 + yx^4$. $\boxed{xy(y^3 + x^3)}$

27. Determine all the x-vlaues that are solutions to $x^2 + x - 1 = 0$. $x = \frac{-1 \pm \sqrt{1 - 4(-1)}}{2} = \boxed{\frac{-1 \pm \sqrt{5}}{2}}$

28. If $5(2x + 3) - (x + 3) = 0$, then what is x?
$10x + 15 - x - 3 = 9x + 12 = 0 \Rightarrow 9x = -12 \Rightarrow \boxed{x = \frac{-12}{9} = -\frac{4}{3}}$

29. Expand $(2m + 3)^2$.
$(2m+3)(2m+3) = 4m^2 + 6m + 6m + 9 = \boxed{4m^2 + 12m + 9}$

30. The average of x, y and z is 80. If two of the numbers are 74 and 78, then what is the other number?
$\frac{x+y+z}{3} = 80 \Rightarrow x + 74 + 78 = 240$
$\Rightarrow x = 240 - 74 - 78 = \boxed{88}$

31. Simplify the expression $4^2 + 4^0$.
$16 + 1 = \boxed{17}$

32. Simplify $\sqrt{64x^{16}}$. $= \boxed{8x^8}$

33. Simplify $\frac{6}{7} - \frac{1}{3}$. $\frac{18-7}{21} = \boxed{\frac{11}{21}}$

34. Simplify $\frac{5}{7} \div \left(\frac{5}{9} + \frac{1}{7}\right)$. $\frac{5}{7} \div \frac{35+9}{63} = \frac{5}{7} \cdot \frac{\cancel{63}^{9}}{44} = \boxed{\frac{45}{44}}$

35. Simplify $19.27 - 14.539$.
$\boxed{4.731}$

36. Simplify $(6.38)(0.542)$. 3.45796

37. Simplify $\dfrac{15M^2 + 5M}{5M}$. $= 3M + 1$

38. Simplify $\dfrac{7}{3} \times \dfrac{1}{2}$. $\dfrac{7}{6}$

39. Evaluate $x^2y - 2xy - y^2$ when $x = -3$ and $y = -4$. $(-3)^2(-4) - 2(-3)(-4) - (-4)^2$
$9(-4) - (24) - 16$
$-36 - 24 - 16 = -76$

40. Solve for x in the equation $5x - 10 = 2 - 2x$.
$7x = 12 \Rightarrow x = 12/7$

41. Solve for x in the equation $x^2 - 1 = 0$.
$x = \pm 1$

42. Solve for x in the inequality $1 - 5x < 3 + x$. $-5x - x < 2 \Rightarrow -6x < 2$
$\Rightarrow x > \frac{1}{3}$

43. Solve for x in the equation $\dfrac{5}{10} = \dfrac{15}{x}$. $x = \frac{15}{5} \cdot 10 \Rightarrow x = 30$

44. Perform the indicated operation and simplify the expression $3x - (5x - 4)$.
$3x - 5x + 4 = -2x + 4$

45. Perform the indicated operation and simplify the expression $(x^2 - 2x + 2) - (4x^2 - 8x - 3)$. $x^2 - 4x^2 - 2x + 8x + 2 + 3 = -3x^2 + 6x + 5$

46. Expand the expression $(4x - 5)(3x + 2)$.
$12x^2 + 8x - 15x - 10 = 12x^2 - 7x - 10$

47. Solve for x in the equation $x^2 - 3x + 1 = 0$.
$x = \dfrac{3 \pm \sqrt{9 - 4(1)}}{2} = \dfrac{3 \pm \sqrt{5}}{2}$

48. Solve for a and b in the linear system

$$\begin{aligned} 3a + b &= 3, \\ a - 2b &= 1. \end{aligned}$$

$2(3a+b=3) \Rightarrow 6a+2b=6$

$a-2b=1$

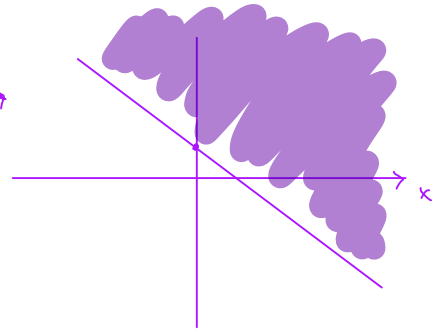
$7a=7 \Rightarrow \boxed{a=1}$

$1-2b=1 \Rightarrow \boxed{b=0}$

49. Shade the region of the xy-plane described by $\{(x, y) \,|\, x + 2y \geq 1\}$.

50. Determine the equation for the line with slope $1/3$ that passes through the point $(3, -2)$. $\longrightarrow$ $y-(-2) = \frac{1}{3}(x-3) \Rightarrow y = \frac{1}{3}x - 1 - 2$

$\boxed{y = \frac{1}{3}x - 3}$



$x + 2y \geq 1$

$2y \geq 1 - x$

$y \geq \frac{1}{2} - \frac{1}{2}x$