

Answers for Examples in the Synopsis of the Math Placement Test

1 - 5. Fractions: Preliminaries

Write in lowest terms: $\frac{28}{52}$

We note that both the numerator and denominator are divisible by 4 and so the reduction is $\frac{7}{13}$.

6 - 10. Fractions: Addition, Subtraction

$$1\frac{2}{3} + 2\frac{5}{6} =$$

$$1\frac{2}{3} + 2\frac{5}{6} = \frac{5}{3} + \frac{17}{6} = \frac{10}{6} + \frac{17}{6} = \frac{27}{6} = \frac{9}{2} \text{ or } 4\frac{1}{2}$$

11 - 15. Fractions: Multiplication and Division

$$4\frac{1}{7} \div 3\frac{1}{4} =$$

$$4\frac{1}{7} \div 3\frac{1}{4} = \frac{29}{7} \div \frac{13}{4} = \frac{29}{7} \times \frac{4}{13} = \frac{116}{91} \text{ or } 1\frac{25}{91}$$

16 - 20. Decimals:

$$3.0 \times 1.2 \times .003 =$$

$$3.0 \times 1.2 \times .003 = 3.6 \times 0.003 = 0.0108.$$

21 - 25. Percents:

$$20\% \text{ of } 75 =$$

$$20\% \text{ of } 75 = 0.2 \times 75 = 15.$$

26 - 30. Order of operations:

$$45 \div 9 - 5 \times 3 =$$

We know that multiplication and division must be completed before addition and subtraction and so:
 $45 \div 9 - 5 \times 3 = 5 - 15 = -10.$

31 - 35. Laws of Signs:

$$-(-4) \div (-2) + 6 =$$

$$-(-4) \div (-2) + 6 = 4 \div (-2) + 6 = -2 + 6 = 4.$$

36 - 40. Equations:

$$\text{If } 4(x - 2) - 3x = 5(2 - x), \text{ then } x =$$

$$4(x - 2) - 3x = 5(2 - x) \Rightarrow 4x - 8 - 3x = 10 - 5x \Rightarrow 6x = 18 \Rightarrow x = 3.$$

41 - 45. Laws of Exponents:

$$(2t^5)^3 =$$

$$(2t^5)^3 = 8t^{15}.$$

46 - 50. Negative Exponents:

$$(b^3)^{-4} =$$

$$(b^3)^{-4} = b^{-12}.$$

51 - 55. Formula Rearrangement:

$$\text{If } p = \frac{q-r}{s}, \text{ then } r =$$

$$p = \frac{q-r}{s} \Rightarrow ps = q-r \Rightarrow ps-q = -r \Rightarrow r = q-ps.$$

56 - 60. Algebraic Fractions:

$$\frac{2x}{3y} + \frac{4z}{y} =$$

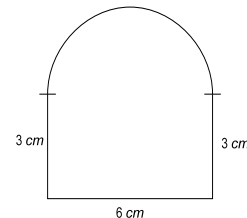
$$\frac{2x}{3y} + \frac{4z}{y} = \frac{2x}{3y} + \frac{12z}{3y} = \frac{2x+12z}{3y} = \frac{2(x+6z)}{3y}$$

61 - 65. Mensuration:

Find the perimeter of the entire figure in the diagram.

The perimeter of the figure will be the three sides of the rectangular part plus the arclength of the semicircle. Hence, we have:

$$3 + 6 + 3 + \frac{1}{2}(2\pi 3) = 12 + 3\pi \text{ cm.}$$



66 - 70. Quadratic Equations:

Solve for x : $x^2 - x = 6$

$$x^2 - x = 6 \Rightarrow x^2 - x - 6 = 0 \Rightarrow (x - 3)(x + 2) = 0 \Rightarrow x = 3 \text{ or } x = -2.$$

71 - 75. Graphing:

What is the y -intercept of the line represented by $y = -\frac{x}{3} + \frac{1}{2}$?

Since the equation is in the form $y = mx + b$ we can read the y -intercept directly. It is $\frac{1}{2}$.

76 - 80. Algebraic Fractions II:

Simplify: $\left(\frac{2}{xy} + \frac{1}{x}\right) \div \frac{3}{xy}$

$$\left(\frac{2}{xy} + \frac{1}{x}\right) \div \frac{3}{xy} = \left(\frac{2}{xy} + \frac{y}{xy}\right) \div \frac{3}{xy} = \left(\frac{2+y}{xy}\right) \times \frac{xy}{3} = \frac{2+y}{3}$$

81 - 85. Radicals and Fractional Exponents:

$$4^{\frac{1}{2}} \times \sqrt[3]{27}$$

$$4^{\frac{1}{2}} \times \sqrt[3]{27} = \sqrt{4} \times \sqrt[3]{27} = 2 \times 3 = 6.$$

86 - 90. Logarithms:

Simplify: $\log 5 + \log 4$

We know that $\log x + \log y = \log xy$. Therefore, $\log 5 + \log 4 = \log 20$.

91 - 95. Trigonometry:

2π radians = (Answer in $^\circ$)

2π radians is one complete rotation and so, 2π radians = 360°

96 - 100. Questions ("Word Problems"):

Five less than three times one seventh of a number is 4. Find the number.

$$3 \cdot \frac{1}{7}x - 5 = 4 \Rightarrow 3x - 35 = 28 \Rightarrow 3x = 63 \Rightarrow x = 21.$$

Thus, the required number is 21.