

Diagnostic Test

Name: _____

Solutions

1. Simplify:

$$\begin{aligned} \text{a) } \frac{5}{6} + \frac{5}{8} &= \frac{20}{24} + \frac{15}{24} \\ &= \frac{35}{24} \\ &= 1\frac{11}{24} \end{aligned}$$

$$\begin{aligned} \text{b) } \frac{5}{6} - \frac{1}{3} &= \frac{5}{6} - \frac{2}{6} \\ &= \frac{3}{6} \\ &= \frac{1}{2} \end{aligned}$$

$$\begin{aligned} \text{c) } 3\frac{1}{5} + 2\frac{2}{3} &= \frac{16}{5} + \frac{8}{3} \\ &= \frac{48}{15} + \frac{40}{15} \\ &= \frac{88}{15} \\ &= 5\frac{13}{15} \end{aligned}$$

$$\begin{aligned} \text{d) } \frac{9}{11} \div \frac{12}{22} &= \frac{9}{11} \times \frac{22}{12} \\ &= \frac{3}{1} \times \frac{2}{4} \\ &= \frac{3}{1} \times \frac{1}{2} \\ &= \frac{3}{2} = 1\frac{1}{2} \end{aligned}$$

$$\begin{aligned} \text{e) } 3\frac{2}{3} \times 2\frac{3}{4} &= \frac{11}{3} \times \frac{11}{4} \\ &= \frac{121}{12} \\ &= 10\frac{1}{12} \end{aligned}$$

2. Fill in the missing term:

$$3:5 : \underline{7} = 12 : \underline{20} : 28$$

3. Write as a rate: 120 km in 3 hours

$$120 \div 3 = 40 \text{ km/hr}$$

4. Write as a ratio (in lowest): 15mm to 3 cm

$$15:30 = 1:2$$

5. Fill in the chart:

↑
30mm

Percent	Fraction	Decimal
54%	$\frac{54}{100} = \frac{27}{50}$	0.54
62.5%	$\frac{5}{8} \rightarrow 8 \overline{) 5.000}$	0.625

6. Simplify:

$$\begin{aligned} \text{a) } 3^3 &= 3 \times 3 \times 3 \\ &= 27 \end{aligned}$$

$$\begin{aligned} \text{b) } 2^6 &= 2 \times 2 \times 2 \times 2 \times 2 \times 2 \\ &= 4 \times 4 \times 4 \\ &= 64 \end{aligned}$$

$$\begin{aligned} \text{c) } (-5)^2 &= (-5) \times (-5) \\ &= 25 \end{aligned}$$

$$\begin{aligned} \text{d) } -5^2 &= -(5 \times 5) \\ &= -25 \end{aligned}$$

$$\begin{aligned} \text{e) } 2^3 \times 5^2 &= 8 \times 25 \\ &= 200 \end{aligned}$$

7. Write as a power with base 2.

$$\begin{aligned} 32 &= \underline{2 \times 2 \times 2 \times 2 \times 2} \\ &= 2^5 \end{aligned}$$

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8. Evaluate for $x=3$ and $y=4$

a) $5x - y$

$$\begin{aligned} &= 5(3) - (4) \\ &= 15 - 4 \\ &= 11 \end{aligned}$$

b) $2(x - y)^2$

$$\begin{aligned} &= 2(3 - 4)^2 \\ &= 2(-1)^2 \\ &= 2(1) \\ &= 2 \end{aligned}$$

9. Evaluate:

a) $5 - (-2)$

$$\begin{aligned} &= 5 + 2 \\ &= 7 \end{aligned}$$

b) $-7 + (-3)$

$$\begin{aligned} &= -7 - 3 \\ &= -10 \end{aligned}$$

c) $-8(4)$

$$= -32$$

d) $-4(-6)$

$$= 24$$

e) $\frac{-27}{9}$

$$= -3$$

f) $-3(-2)^3$

$$\begin{aligned} &= -3(-8) \\ &= 24 \end{aligned}$$

g) $-(5-8) - (-4)(5)$

$$\begin{aligned} &= -(-3) - (-20) \\ &= 3 + 20 \\ &= 23 \end{aligned}$$

h) $2(-3)^2 - 5(-2)$

$$\begin{aligned} &= 2(9) + 10 \\ &= 18 + 10 \\ &= 28 \end{aligned}$$

i) $\frac{5+8 \times 2}{9-2}$

$$\begin{aligned} &= \frac{5+16}{7} \\ &= \frac{21}{7} \\ &= 3 \end{aligned}$$

10. Write a mathematical expression for each using the variable x

a) a number doubled and increased by 5

$$\underline{2x + 5}$$

b) Peter's age 2 years ago

$$\underline{x - 2}$$

11. Solve showing all your work:

a) $x + 7 = 3$

$$\begin{aligned} x &= 3 - 7 \\ x &= -4 \end{aligned}$$

b) $m - 5 = 8$

$$\begin{aligned} m &= 8 + 5 \\ m &= 13 \end{aligned}$$

c) $-4y = 36$

$$\begin{aligned} \frac{-4y}{-4} &= \frac{36}{-4} \\ y &= -9 \end{aligned}$$

d) $2k - 3 = 5$

$$\begin{aligned} 2k &= 5 + 3 \\ 2k &= 8 \\ \frac{2k}{2} &= \frac{8}{2} \\ k &= 4 \end{aligned}$$

e) $\frac{2}{3}n = 12$

$$\begin{aligned} 2n &= 12(3) \\ 2n &= 36 \\ \frac{2n}{2} &= \frac{36}{2} \\ n &= 18 \end{aligned}$$

f) $\frac{1}{2}x + 7 = 10$

$$\begin{aligned} \frac{1}{2}x &= 10 - 7 \\ \frac{1}{2}x &= 3 \\ x &= 3(2) \\ x &= 6 \end{aligned}$$