

*Order of operations I*

Remember the rules for the order of operations.

First, do all the operations in brackets. Next exponents.

Then, do any multiplication and division as they occur, left to right.

Last, do any addition and subtraction as these occur, left to right.

1. Find the value of each of the following. Show your work.

a)  $8 + (1 - 8)$   
 $8 + (-7)$

1

b)  $3^3 \div 3^2 - 1 - 2 - 3$

-3

c)  $4^2 \times 7 - 6^2 + 1 + 8^2$   
 $= 16 \times 7 - 36 + 1 + 64 = 112 - 36 + 1 + 64$

141

d)  $(-7)^2 + (6 \div 3)$

51

e)  $8 \div (2 \times 2)^2$

2

f)  $8 \div 2 \times 2^2$

16

g)  $2^3(9^3 - 7^3)$

3088

h)  $2^3 - (8 + 6)$

-6

i)  $10 \times 3^2 + 5$

95

j)  $5^2 - 12 \div 3 \times 2^2$

9

k)  $4^2 - 5(4 - 3)^2$

11

l)  $(2^4 - 5 \times 2) \div 3$

2

m)  $(3^2 - 2)^2$

49

n)  $34 + 6 \times (4^2 \div 2)$

82

o)  $3^4 - (9 \times (-4)) \div 2$

99

p)  $7^2(9^2 \div 3)$

1323

q)  $1 - 5^3 + 6^2 + 8 \times 1^3$

-80

r)  $4(17 - 4)^0 \times (3 + 6)^0$

4

s)  $9 \times (2^3 \div 4 - 3)$

-9

t)  $2 \times (3^2 + 5) - 4^2$

12

u)  $(14 - 8)^2 - (2^2 + 18 \div 6)^2$

-13

v)  $54 \div 6 + (-2)^4$

25

w)  $4^3 - (3^2 - 4 \times 5)$

75

x)  $(3 + 2^2) + 4^0 - 5 \times 2$

-2

y)  $10 \times (13 \times 3^2 + 8^2) \div 5$

362

z)  $(12 + 52 - 6^2) \div (14 - 6)$

3.5

2. Evaluate. Show your work.

$$\begin{aligned} \text{a) } \frac{(6-4)^3 \times 3}{2(8-5)} &= \frac{2^3 \times 3}{2(\cancel{8})} \\ &= \frac{8}{2} \\ &= \boxed{4} \end{aligned}$$

$$\begin{aligned} \text{b) } \frac{3^2 \times 10}{8-3} &= \frac{\cancel{3} \times \cancel{10}^2}{\cancel{8}^1} \\ &= \boxed{18} \end{aligned}$$

$$\begin{aligned} \text{c) } \frac{(2^3+2)(7-3)}{4^2 \div (6-4)} &= \frac{(8+2)(4)}{16 \div 2} \\ &= \frac{10 \cdot 4}{8} \\ &= \frac{40}{8} \\ &= \boxed{5} \end{aligned}$$

$$\begin{aligned} \text{d) } \frac{2^2 \times 5 - (2-3^2)}{2^2 \times 3 - (5+4)} &= \frac{4 \times 5 - (2-9)}{4 \times 3 - 9} \\ &= \frac{20 - (-7)}{12 - 9} \\ &= \frac{27}{3} \\ &= \boxed{9} \end{aligned}$$

$$\begin{aligned} \text{e) } \frac{5(6+2)^2 + 2^2(7-2)}{5(9-11)} &= \frac{5 \cdot 8^2 + 4(5)}{5(-2)} \\ &= \frac{5 \cdot 64 + 20}{-10} \\ &= \frac{320 + 20}{-10} \\ &= \boxed{-34} \end{aligned}$$

$$\begin{aligned} \text{f) } \frac{12 \div 3 + 8 \times 2 + 6 \times 2}{5 + 3 \times 4 - 9} &= \frac{4 + 16 + 12}{5 + 12 - 9} \\ &= \frac{32}{8} \\ &= \boxed{4} \end{aligned}$$

$$\begin{aligned} \text{g) } \frac{2^2(8-5) + 2 \times 3 \times (-2)^2}{2^4 - 7} &= \frac{4(3) + 2 \cdot 3 \cdot 4}{16 - 7} \\ &= \frac{12 + 24}{9} \\ &= \frac{36}{9} \\ &= \boxed{4} \end{aligned}$$

$$\begin{aligned} \text{h) } \frac{(6-4)(8+5) + 4^2 - 6}{(7 \times 2)(2^3 - 6) - 10} &= \frac{2(13) + 16 - 6}{14(8-6) - 10} \\ &= \frac{26 + 16 - 6}{14(2) - 10} \\ &= \frac{36}{18} \\ &= \boxed{2} \end{aligned}$$

$$\begin{aligned} \text{i) } \frac{3 + 8(2+5) \times 2^2 - 6}{18 - 4(6-3) + 2 + 3^2} &= \frac{3 + 8(7) \times 4 - 6}{18 - 4(3) + 2 + 9} \\ &= \frac{3 + 56 \times 4 - 6}{18 - 12 + 2 + 9} \\ &= \frac{3 + 224 - 6}{6 + 2 + 9} \\ &= \frac{221}{17} \\ &= \boxed{13} \end{aligned}$$

$$\begin{aligned} \text{j) } \frac{(8+7) + (6 \times 2)(3 \times 2^2) - 3^2}{(6-3)(9+2) + 2^5 + 3 \times 5} &= \frac{15 + (12)(3 \cdot 4) - 9}{3(11) + 32 + 15} \\ &= \frac{15 + 12 \cdot 12 - 9}{33 + 32 + 15} \\ &= \frac{15 + 144 - 9}{80} \\ &= \frac{150}{80} \\ &= \frac{15}{8} \end{aligned}$$