

Getting Ready

In this chapter, you will be working with percents, decimals, rational numbers, exponents and their laws, linear and quadratic equations, zeroes of relationships, and graphs of relationships. These exercises will help you warm up for the work ahead.

1. Extend the pattern to determine the next three numbers in each sequence.

- (a) 3, 6, 9, 12, ■, ■, ■
 (b) 5, 6, 8, 11, ■, ■, ■
 (c) 1, 4, 9, 16, ■, ■, ■
 (d) -4, 5, 1, 6, 7, ■, ■, ■
 (e) -5, -10, -20, -40, ■, ■, ■
 (f) $\frac{2}{3}, \frac{4}{5}, \frac{6}{7}, \frac{8}{9}, \blacksquare, \blacksquare, \blacksquare$

2. Express each percent as a decimal.

- (a) 45% (b) 39%
 (c) 8% (d) 3%
 (e) 98% (f) 4.5%
 (g) 5.25% (h) 0.5%
 (i) 125% (j) 110%

3. Evaluate.

- (a) 5% of 20 (b) 18% of 240
 (c) 3.6% of 50 (d) 2.1% of 36
 (e) 120% of 80 (f) 135% of 150
 (g) 86% of 324 (h) 75% of 60

4. Evaluate.

- (a) $\frac{1}{4} + \frac{-3}{4}$ (b) $\frac{1}{2} - \frac{-2}{3}$
 (c) $-\frac{3}{4} - \frac{1}{-4}$ (d) $-\frac{3}{5} + \frac{3}{-4}$
 (e) $\left(\frac{1}{-2}\right)\left(\frac{-2}{5}\right)$ (f) $-\frac{4}{5} \times \frac{10}{-4}$
 (g) $\left(\frac{-5}{12}\right) - 24$ (h) $\left(-2\frac{1}{4}\right)\left(\frac{2}{-9}\right)$
 (i) $\frac{-4}{3} \div \frac{2}{-3}$ (j) $-7\frac{1}{8} \div \frac{3}{2}$
 (k) $\frac{-2}{3} \div \frac{-3}{8}$ (l) $\frac{-3}{-2} \div \frac{-1}{3}$
 (m) $\left(2\frac{3}{4}\right)\left(-1\frac{1}{4}\right)\left(-\frac{3}{8}\right)$
 (n) $\left(\frac{-2}{5} + \frac{1}{-2}\right) \div \left(\frac{5}{-8} - \frac{-1}{2}\right)$

(o) $\left(\frac{4}{5} - \frac{3}{-4}\right)\left(-\frac{1}{3} - \frac{1}{2}\right)$

5. Evaluate.

- (a) 2^4 (b) $(-3)^2$
 (c) -5^3 (d) 6^{-2}
 (e) $\left(\frac{1}{2}\right)^3$ (f) $\left(\frac{3}{4}\right)^{-2}$
 (g) 13^0 (h) $(1.5)^4$
 (i) $(-7)^{-2}$ (j) 4^4
 (k) $(2^3)(3^2)$ (l) $(4^{-2})(2^5)$

6. Evaluate.

- (a) $4x^2 - 3x + 1$, if $x = 2$
 (b) $2n + 3$, if $n = 10$
 (c) $2(5)^{n+2}$, if $n = 1$
 (d) Prt , if $P = 2000$, $r = 0.08$, and $t = 2$
 (e) $P(1 + i)^n$, if $P = 1000$, $i = 0.01$, and $n = 10$
 (f) $P(1 + i)^{-n}$, if $P = 5000$, $i = 0.02$, and $n = 5$

7. Simplify.

- (a) $(x^4)(x^3)$
 (b) $(x^5)(x^{-3})$
 (c) $(e^2)^3$
 (d) $d^6 \div d^2$
 (e) $(5x^2y^3)(-2xy^2)$
 (f) $(4x^5)^2$
 (g) $(3a^2b^3)^4$
 (h) $20m^3n^4 \div 5m^4n^{-2}$
 (i) $(-2c^{-3}d^5)^{-3}$
 (j) $\left(\frac{3x^2}{4y^3}\right)^2$
 (k) $\frac{(2x)(3x^2y)(-5y^3)}{(10x^{-2}y^2)}$
 (l) $\frac{(6c^4d^3)^2}{(4c)(3d^4)}$

8. Simplify.

- (a) $2x + 3x - 8x$
- (b) $3x^2 - 5y^3 - 6x^2 + 7y^3$
- (c) $(3x + 5) + (2 - 4x) - (2x - 1)$
- (d) $5(2x + 3y)$
- (e) $2(3a - 5b) + 4(3a - 3b)$
- (f) $3a(5b - 6c + 2) + 4c(2a - b + 1)$
- (g) $(x + 5)(x - 2)$
- (h) $(2x - 4)^2$
- (i) $(3x - 2y)(8x + 4y)$
- (j) $(2x + 5)(2x - 5)$

9. Factor fully.

- (a) $6x^2 + 9x - 12xy$
- (b) $a^2 - 81$
- (c) $x^2 + 8x + 12$
- (d) $a^2 - 10a + 25$
- (e) $10x^2 + 17x + 3$
- (f) $6c^2 - 2c - 28$

10. Solve.

- (a) $3x + 15 = 5x - 5$
- (b) $5(2x - 6) = 3(2x + 1) - 10x - 5$
- (c) $2x^2 = 50$
- (d) $(x - 5)(x + 3) = 0$
- (e) $x^2 - x - 12 = 0$
- (f) $3x^2 + 4x = 2$
- (g) $(2x + 1)^2 = 1$
- (h) $5a^2 - 3a + 2 = 2a^2 + a - 2$

11. Determine the first differences and identify the relationship as linear or nonlinear.

(a)

x	y	First Differences
1	8	
2	11	
3	14	
4	17	
5	20	
6	23	

(b)

t	d	First Differences
6	35	
7	48	
8	63	
9	80	
10	99	
11	120	

(c)

x	y	First Differences
-3	$\frac{1}{8}$	
-2	$\frac{1}{4}$	
-1	$\frac{1}{2}$	
0	1	
1	2	
2	4	

(d)

t	h	First Differences
3	-2	
4	-4	
5	-6	
6	-8	
7	-10	
8	-12	

12. i. Sketch a graph of each relationship.
 ii. Use the graph to determine the zeroes of the relationship.

- (a) $y = 2x + 6$
- (b) $y = x^2 - 4$
- (c) $y = x^2 + 3x - 18$
- (d) $y = -x^2 - 5x - 6$