

Practice set 1



In Questions 1 to 6, select the correct answer **A**, **B**, **C** or **D**.

1 Write $\frac{1}{3\sqrt{(x-2)^5}}$ in index form.

A $(x-2)^{-\frac{5}{3}}$

B $\frac{(x-2)^{\frac{5}{2}}}{3}$

C $3(x-2)^{-\frac{5}{2}}$

D $\frac{1}{(x-2)^{\frac{5}{3}}}$

2 Simplify $\frac{(2a^3b)^3}{(ab)^2}$.

A $8a^7b$

B $8a^8b$

C $2a^7b$

D $2a^8b$

3 Evaluate $4^{-\frac{3}{2}}$.

A -8

B $\frac{1}{8}$

C $\frac{1}{6}$

D -6

4 Simplify $\frac{a^2 - 6a + 9}{a^2 - 9}$.

A $\frac{1}{a+3}$

B $\frac{a-3}{a+3}$

C $\frac{a+3}{a-3}$

D $\frac{-6a+9}{a-9}$

5 Factorise $a^2 - \frac{b^2}{4}$.

A $\left(a - \frac{b}{2}\right)^2$

B $\left(a + \frac{b}{4}\right)\left(a - \frac{b}{4}\right)$

C $\left(a + \frac{b}{2}\right)^2$

D $\left(a + \frac{b}{2}\right)\left(a - \frac{b}{2}\right)$

6 The solution to $x^2 + 2x - 6 = 0$ is:

A $x = -1 \pm 2\sqrt{7}$

B $x = \frac{2 \pm \sqrt{28}}{2}$

C $x = \frac{-2 \pm \sqrt{-20}}{2}$

D $x = -1 \pm \sqrt{7}$

7 Solve:

a $3x - 7 = 23$

b $5(b - 3) = 15$

c $\frac{x}{3} + 4 = 5$

d $4y - 7 = 3y + 9$

e $8z + 1 = 11z - 17$

f $2^x = 32$

g $9^{y-1} = 3$

h $x^2 - 3x = 0$

i $|x + 2| = 5$

j $|5a - 2| = 8$

8 Solve for p : $\frac{p-3}{2} - \frac{p+1}{5} = 1$.

9 Simplify $2\sqrt{12}$.

10 Factorise fully: $10x + 2xy - 10y - 2y^2$.

11 Write in index form:

a $\frac{1}{x}$

b $\sqrt[3]{x^4}$

12 Simplify the expression $8y - 2(y + 5)$.

13 Rationalise the denominator of $\frac{5}{5 - \sqrt{2}}$.

14 Solve $2x^2 - 3x - 1 = 0$ correct to 3 significant figures.

15 Simplify $\frac{x+1}{5} \div \frac{x^2-2x-3}{10}$.

16 Evaluate $(3.9)^4$ correct to 1 decimal place.

17 Simplify $2\sqrt{3} - \sqrt{27}$.

18 Expand and simplify $(x - 3)(x^2 + 5x - 1)$.

19 Expand and simplify $\sqrt{2}(3\sqrt{5} - 2\sqrt{2})$.

20 Simplify $\frac{2x+6}{2}$.

21 Solve $4a - 5 < 7a + 4$.

22 The radius r of a circle with area A is given by $r = \sqrt{\frac{A}{\pi}}$. Find r , correct to 2 decimal places, if $A = 7.59$.

23 Solve each set of simultaneous equations.

a $3a - b = 7$ and $2a + b = 8$

b $a + b - c = 8$, $b + c = 5$ and $a + 2c = 3$

- 24** Solve $5 - 2x < 3$ and show the solution on a number line.
- 25** Solve the equation $x^2 - 4x + 1 = 0$, giving exact solutions in simplest surd form.
- 26** Write 7^{-2} as a rational number.
- 27** Solve the simultaneous equations $y = 3x - 1$ and $y = x^2 - 5$.
- 28** Find integers x and y such that $\frac{\sqrt{3}}{2\sqrt{3}+3} = x + y\sqrt{3}$.
- 29** Evaluate $|-2|^2 - |-1| + |4|$.
- 30** Factorise $8x^2 - 32$.
- 31** Rationalise the denominator of $\frac{2\sqrt{3}}{3\sqrt{5}-\sqrt{2}}$.
- 32** Simplify $2|-4| - |3| + |-2|$.
- 33** Rationalise the denominator of $\frac{\sqrt{5}+1}{2\sqrt{2}+3}$.
- 34** Simplify $\frac{(a^{-4})^3 \times b^6}{a^9 \times (b^{-1})^4}$.
- 35** Evaluate $4^{-\frac{3}{2}}$ as a rational number.
- 36** Simplify $2(x-5) - 3(x-1)$.
- 37** Solve $4^{2x+1} = 8$.
- 38** Write $\frac{1}{x+3}$ in index form.
- 39** Find the value of a^3b^{-2} in index form if $a = \left(\frac{1}{2}\right)^3$ and $b = \left(\frac{4}{5}\right)^2$.
- 40** Write $(3x+2)^{-\frac{1}{2}}$ without an index.

41 Simplify:

a $8x - 7y - y + 4x$

b $\sqrt{124}$

c $\frac{x^2 - 9}{2x^2 + 5x - 3}$

d $\frac{1}{\sqrt{2} + 1} + \frac{2}{\sqrt{2} - 1}$

e $\frac{3}{x+1} + \frac{2}{x^2-1} - \frac{4}{x-1}$

f $x - \frac{1}{x}$ when $x = 2\sqrt{3}$

g $\frac{(x^{-2})^5 y^4 z^{-3}}{x^4 (y^3)^{-1} (z^{-4})^{-2}}$

h $\frac{a+b}{5a-20ab^2} \div \frac{a^2+2ab+b^2}{3-6b}$

i $8\sqrt{5} - 3\sqrt{20} + 2\sqrt{45}$

j $\frac{a^3 b^2 (c^4)^2}{(a^2)^2 b c^5}$ if $a = \left(\frac{1}{2}\right)^2$, $b = \left(\frac{2}{3}\right)^3$ and $c = \left(\frac{4}{9}\right)^{-1}$.

42 The volume of a sphere is given by the formula $V = \frac{4}{3} \pi r^3$. Find the exact radius r if the volume V is $10\frac{2}{3} \text{ cm}^3$.

43 Find the value of k if $(2x + 5)^2 = 4x^2 + kx + 25$.

44 Simplify $\sqrt{81x^2y^3}$.

45 Factorise:

a $5(a-2)^2 + 40(a-2)$

b $(2a-b+c)^2 - (a+5b-c)^2$

46 Solve $-2 \leq \frac{8x-1}{5} < 9$.

47 Simplify $\frac{x+1}{5} - \frac{x+2}{3}$.

48 Solve $x^2 - 5x = 0$.

49 Solve $x^2 - 5x - 1 = 0$ and write the solutions correct to 2 decimal places.

50 Simplify $\sqrt{8} + \sqrt{98}$.

51 Write $\frac{3}{x^2+5x} - \frac{4}{x} + \frac{2}{x+5}$ as a single fraction.

52 Solve for x : $4^{2x-1} = \frac{1}{8}$.

53 Factorise:

a $x^2 - 2x - 8$

b $a^2 - 9$

c $y^2 + 6y + 9$

d $t^2 + 8t + 16$

e $3x^2 - 11x + 6$

54 Solve:

a $5x - 4 = 2x + 11$

b $y^2 - 2y - 13 = 0$ (correct to 2 decimal places)

c $4^{2x} = 8$

d $|2b + 3| = 7$