Practice Paper 1

Approximation | Algebra | Linear equations | Applications

Name: _____ Class: _____ Date: _____

30 questions | Answer all questions and show your working.

Give exact answers unless a level of accuracy is stated.

A calculator may be used except where a question states otherwise.

1. Simplify.

$$3(x+3y)+2(2x-4y)$$

2. Simplify to a single fraction.

$$\frac{3p-2q}{4}-\frac{2p-5q}{3}$$

3. Expand and simplify.

$$5-3[2-(3-2x)]$$

4. Factorise completely.

$12ax-9ay+6a$

5. Factorise completely.

$3u(2v-5)-2(4v-10)$

6. Given a = -2 and b = 3, find the value of w.

$$w=\frac{a^2-2b}{3}$$

7. Round 0.048763 to (a) 3 significant figures and (b) 4 decimal places. Then round 7284.65 to (c) 2 significant figures.

8. Write each statement as a simplified algebraic expression.

(a) Divide 6t by 4v.

(b) Add 12 to the product of h and m.

(c) Subtract $3c+2$ from $5c+7$.

9. Solve the equation.

$4x-7=3$

10. Solve the equation.

$$5(x-2)-2(x+3)=-7$$

11. Solve the equation.

$$\frac{x-2}{3}+\frac{x+1}{4}=\frac{53}{24}$$

12. Solve the equation.

$$\frac{3x-4}{5}-\frac{x+2}{3}=\frac{2}{15}$$

13. Solve the equation and state the value x cannot take.

$$\frac{16}{x-3}=4$$

14. Solve the equation.

$$0.3(x-2)+0.4x=2.9$$

15. For each equation, state whether there is one solution, no solution, or infinitely many solutions. Give the solution when there is one.

(a) $4(x+2)=4x+8$

(b) $4(x+2)=4x+9$

(c) $4x+7=5x$

16. A student solves $3(x-7)=12$ by writing $3x-7=12$. Identify the error and give the correct solution.

17. An adult ticket costs p dollars. A child ticket costs $7 less. A group buys 3 adult and 4 child tickets.

(a) Write a simplified expression for the total cost.

(b) Find the total cost when p = 40.

18. Mei is x years old. Her brother is 5 years older. Their mother is three times Mei's age, and their father is twice her brother's age. Their total age is 85 years.

(a) Form an equation in x.

(b) Find all four ages.

19. The sum of three consecutive odd integers is 57. Form an equation and find the integers.

20. A rectangle has length $3x+2$ cm and width $x+1$ cm. Its perimeter is 46 cm.

(a) Write its perimeter as a simplified expression.

(b) Find x and both dimensions.

21. A bicycle hire shop charges a fixed fee of \$3 and \$1.50 for each hour. Arun pays \$18.00. Form an equation and find how many hours he hires the bicycle.

22. A student spends $\frac{1}{3}$ of her money on a book, then $\frac{3}{8}$ of the remaining money on stationery. She has \$25.00 left. Use an equation to find her original amount.

23. A rectangle has width 6 cm and length $2x+3$ cm. Its area is 102 cm². Form an equation and find its perimeter.

24. Round each number to 1 significant figure to estimate the expression.

State whether the estimate is above or below the exact value.

$$\frac{\sqrt{101}\times 61.0}{(1.91)^3}$$

25. The following equation is true for every value of x. Find A and B.

$$3(x+5)+2(x-2)=Ax+B$$

26. The equation below has solution $x=2$. Find k. Then solve the same equation when k is increased by 7.

$$4(x-2)+3(x+3)=k$$

27. Use a calculator to evaluate the expression. Give the answer to (a) 4 significant figures and (b) 3 decimal places.

$$\frac{3(\sqrt{500}-2.14)}{80\sqrt{35}}$$

28. A tank initially contains x litres of water. One third is drained and 4 litres is added. The tank now contains 20 litres.

(a) Form an equation in x.

(b) Find the initial amount.

29. A rectangle has length $2x+3$ cm and width x cm.

(a) Write and simplify an expression for its area.

(b) Write and simplify an expression for its perimeter.

(c) Find its length when x = 1.

30. A shop sells large boxes containing 5 pens and small boxes containing 3 pens. There are four more small boxes than large boxes. The boxes contain 84 pens altogether.

(a) Let x be the number of large boxes. Form an equation.

(b) Find the number of each type of box.

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Final Answers

1. $7x+y$

2. $\frac{p+14q}{12}$

3. $-6x+8$

4. $3a(4x-3y+2)$

5. $(3u-4)(2v-5)$

6. $\frac{-2}{3}$

Final Answers

7. (a) 0.0488

(b) 0.0488

(c) 7300

8. (a) $\frac{3t}{2v}$

(b) $hm+12$

(c) $2c+5$

9. $x=\frac{5}{2}$

10. $x=3$

11. $x=\frac{9}{2}$

12. $x=6$

Final Answers

13. $x=7$

$x\neq 3$

14. $x=5$

15. (a) Infinitely many solutions.

(b) No solution.

(c) $x=7$

16. The constant inside the brackets must also be multiplied by 3; $x=11$.

17. (a) $7p-28$ dollars

(b) $252.00

18. (a) $7x+15=85$

(b) Mei 10; brother 15; mother 30; father 30 years.

Final Answers

19. $3x+6=57$; 17, 19, 21.

20. (a) $8x+6$

(b) x = 5; length 17 cm; width 6 cm.

21. $3+1.5h=18$; 10 hours.

22. $\frac{5x}{12}=25$; \$60.00.

23. $6(2x+3)=102$; 46 cm.

24. 75

Below the exact value.

Final Answers

25. A = 5; B = 11.

26. k = 15

$x=3$

27. (a) 0.1282

(b) 0.128

28. (a) $\frac{2x}{3}+4=20$

(b) 24 litres

29. (a) $2x^2+3x$ cm²

(b) $6x+6$ cm

(c) 5 cm

30. (a) $5x+3(x+4)=84$

(b) 9 large boxes and 13 small boxes.