The Maths Society

Simplifying Expressions

$x^2 + x + y^2 + 2x$

(a) $5x + y^2$

(b) $4x^2 + y^2$

(c) $x^2 + 3x + y^2$

(d) $4xy^2$

$x + 3 \times (10 + y) - 7x - y$

$x + 30 + 3y - 7x - y$

$x - 7x + 3y - y + 30$

$-6x + 2y + 30$

$x(y + z) = xy + xz$

$4(2a + 3a + 4) + 6b$

$4(5a + 4) + 6b$

$4(5a) + 4 \times 4 + 6b$

$20a + 16 + 6b$

$20a + 6b + 16$

1. Simplify $y + y$

2y

(1)

2. Circle the expression that is equal to $y + y + y - y$

$4y$ 3 $2y$ y^2

(1)

3. Simplify $4c + 2c$

6c

(1)

4. Simplify $8x - 2x + 4x$

10x

(1)

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5. (a) Simplify $a + a + a$

3a

.....

(1)

(b) Simplify $4a + 3a - a$

6a

.....

(1)

(c) Simplify $4ac + 5ac$

9ac

.....

(1)

(d) Simplify $4c - 6c$

-2c

.....

(1)

(e) Simplify $a^2 + a^2$

$2a^2$

.....

(1)

6. Simplify $6y - 5 + 2y$

8y - 5

(1)

7. (a) Simplify $m + m + m + m$

4m

(1)

(b) Simplify $8c + 2p - 2c + 4p$

6c + 6p

(2)

8. Simplify $3x + 4 - x + 7$

2x + 11

(2)

9. Simplify $6a + 5w - 2a + w$

4a + 6w

= 2(2a + 3w)

2(2a + 3w)

(2)

10. Simplify $7x - 4y + 8x - y$

$15x - 5y$

$= 5(3x - y)$

$5(3x - y)$

(2)

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11. (a) Simplify $9y - 3y$

$6y$

(1)

(b) Simplify $7y + 2w - 3y + 2w$

$4y + 4w$

$4(y + w)$

(2)

(c) Simplify $7y + 10 + 3y - 9$

$10y + 1$

(2)

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12. Simplify $4x + 7y + x - 4y$

$5x + 3y$

(2)

13. Simplify $5x + y - 2x + y$

$3x+2y$

(2)

14. Simplify $3c - 10d - c + 4d$

$2c-6d$

$= 2(c-3d)$

$2(c-3d)$

(2)

15. Simplify $20x + 3y - 8y - 7x$

$13x-5y$

$13x-5y$

(2)

16. Simplify $8x - 6y + 3x - 3y$

$11x-9y$

(2)

17. (a) Simplify $s + s + s + s - s$

3s

(1)

(b) Simplify $5c - 3s + 3c + 7s$

8c+4s
= 4(2c+s)

4(2c+s)

(2)

(c) Simplify $8a + 3c - 5c + 3a$

11a-2c

(2)

(d) Simplify $3a + 2w - 5a - 9w$

-2a-7w

(2)

(e) Simplify $3y^2 + 2w^2 + y^2 - w^2$

$4y^2+w^2$

(2)

18. (a) Simplify $2x + 2x$

$4x$

.....

(1)

(b) Simplify $7w - 2w$

$5w$

.....

(1)

(c) Simplify $3m - m$

$2m$

.....

(1)

(d) Simplify $y^2 + y^2 + y^2$

$3y^2$

.....

(1)

(e) Simplify $7h + 5k + h - 3k$

$8h + 2k$

$= 2(4h + k)$

$2(4h + k)$

.....

(2)

19. Troy is simplifying $x^3 + x^3$

He says the answer is $2x^6$

Explain why Troy is wrong.

It is $2x^3$ because the variable does not change

(1)

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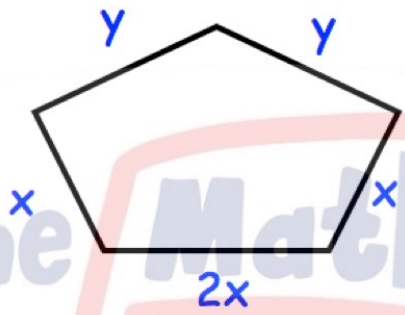
20. Shown is a pentagon.



Find an expression, in terms of x and y, for the perimeter of the pentagon.

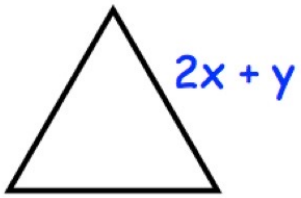
$2y+4x$

$2(y+2x)$

$2y+4x$

(2)

21. Shown is a equilateral triangle.



The length of each side is 2x + y

Find an expression, in terms of x and y, for the perimeter of the triangle.

$3(2x+y)$

$= 6x+3y$

$6x+3y$

(2)

22. Shown is a rectangle.

Find an expression, in terms of x, for the perimeter of the rectangle.

$2(2x+7)+2(x+3)$

$= 4x+14+2x+6$

$= 6x+20$

$6x+20$

(2)

23. Simplify fully $2x^2 + 3x - 1 - x^2 + 2x - 5$

$x^2 + 5x - 6$

x^2+5x-6

(2)

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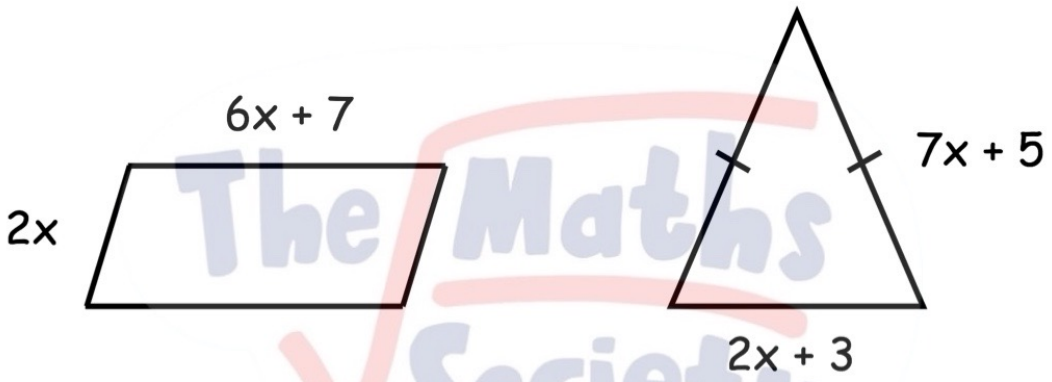
24. Below is a parallelogram and an isosceles triangle.



Which shape has the greatest perimeter?
Show your working.

$2(2x) + 2(6x+7) = 4x + 12x + 14$

$= 16x + 14$

$2(7x+5) + 2x+3 = 14x + 10 + 2x + 3$

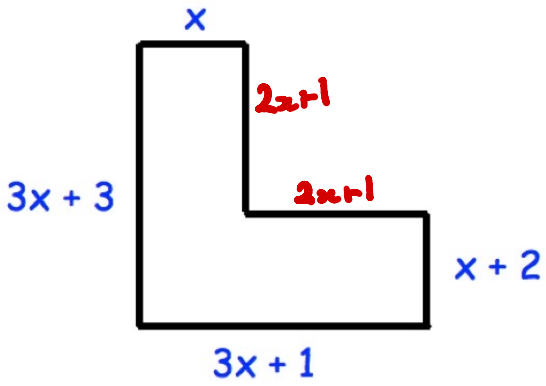
$= 16x + 13$

$16x + 14 > 16x + 13$

parallelogram

(3)

25.



Find an expression, in terms of x, for the perimeter of this L shape.

$3x+1-x=2x+1$

$3x+3-(x+2)=3x+3-x-2=2x+1$

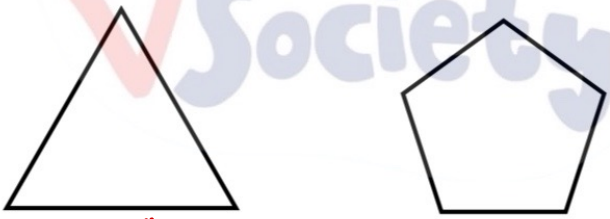
Perimeter $=3x+3+3x+1+x+2+2(2x+1)+x$

$=12x+6$

$12x+8$

(3)

26. Here is an equilateral triangle and a regular pentagon.



The perimeter of the two shapes are equal.

Find an expression for the length of each side of the regular pentagon.

$3(2x+36)=6x+90$

$\frac{6x+90}{5}=\frac{6}{5}x+18$

$\frac{6}{5}x+18$

(4)

27. Expand and simplify $3(x + 6) + 8$

$3x+18+8 = 3x+26$

$3x+26$

(2)

28. Simplify fully $9(y - 2) + 4y + 3$

$9y-18+4y+3$

$= 13y-15$

$13y-15$

(2)

29. Expand and simplify $5(x + 3y) + 2(2x - y)$

$5x+15y+4x-2y$

$= 9x+13y$

$9x+13y$

(3)

30. Expand and simplify $3(4x - 1) - 2(x + 4)$

$12x - 3 - 2x - 8$

$= 10x - 11$

$10x - 11$

.....

(3)

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31. Expand and simplify $3(4x + 8) - (7x - 2)$

$12x + 24 - 7x + 2$

$= 5x + 26$

$5x + 26$

.....

(2)