

7. Solve the following exponential equations for x :

a) $(2 \cdot 3^x)^2 = \frac{4}{9}$

b) $2^{x+5} - 2^{x+3} = 384$

c) $\frac{5}{2}x^3 = 67\frac{1}{2}$

d) $5^{x+2} - 5^{x-1} = 620$

8. Given the pattern: $x - 1; x; x + 1; x + 2 \dots$

a) What is the constant difference in this pattern?

b) What is the formula for this pattern?

c) Determine the 11th term.

d) Which term is equal to $x + 98$?

9. Sarah is baking cupcakes for charity. Each cupcake requires 3 smarties. Sarah eats two smarties before starting to decorate the cupcakes.

a) Write down a formula to express how many smarties Sarah needs if she bakes n cupcakes.

b) If a box of Smarties has 140 smarties in it, how many cupcakes can Sarah make?

c) If Sarah wants to make 50 cupcakes, how many smarties will she need?

10. Solve for x in each of these equations:

a) $\frac{1}{2}x + 12 = 13\frac{1}{2}$

b) $3(x - 4) = \frac{1}{4}(x + 2)$

c) $5x^2 + 24x = 5$

d) $2x^2 + 18 = 13x$

e) $3x < x - 6$

f) $\frac{1}{2}x + 2 \geq \frac{3}{4}x - 4$

11. Solve for x and y simultaneously:

a) $y = 3x - 7$ and $4y = -5x + 6$

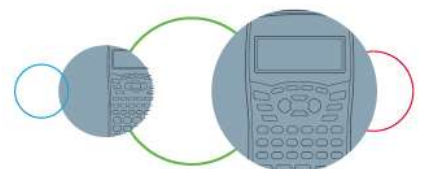
b) $5y = 7x + 9$ and $-2y = 5x + 12$

12. For each of these equations find the r in terms of the other variables:

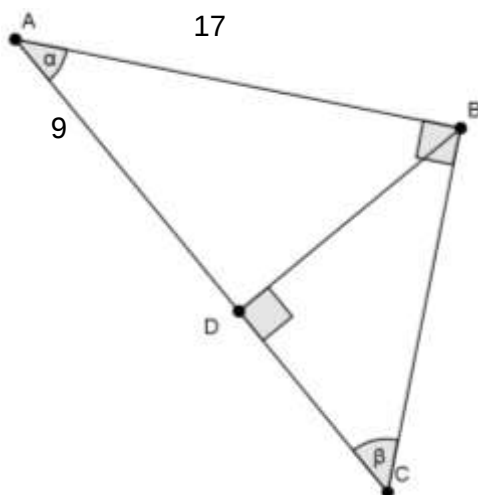
a) $A = \pi r^2$

b) $A = P(1 + r)^n$

13. A square piece of paper is x cm long and $y + 3$ cm wide. Its perimeter is 36cm. Determine the values of x and y .



14. Use the information given on the triangle below and determine:



- a) DB
- b) α
- c) β
- d) BC
- e) DC
- f) AC
- g) Area of $\triangle ABC$

15. Prove the following identities:

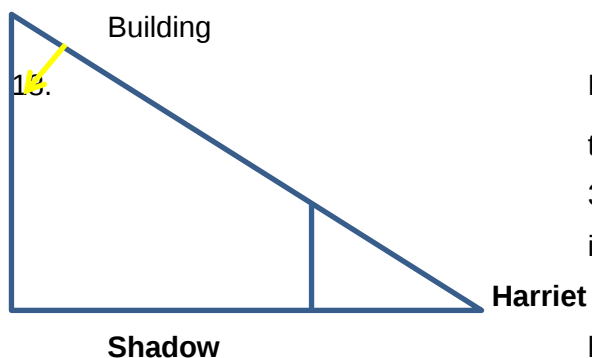
a) $\tan(x) \cdot \cos(x) = \sin x$ b) $\sec x \cdot \cot x = \operatorname{cosec} x$

16. Determine the value of each these expressions (leave in surd form where possible):

- a) $\sin 30^\circ$ b) $\cos 45^\circ$ c) $\tan 60^\circ$
- d) $\sin 75^\circ$ e) $\cos 68^\circ$ f) $\tan 50^\circ$

17. Given: 46° 78° 30° 40° 95° 45° 66° 60°

Give the special angles from the list given above.



Harriet stands on stilts $59\frac{8}{13}m$ from the entrance to a building. The shadow cast by the building is 31 times Harriet's height. Determine the angle of inclination from the tip of the building's shadow to the top of the building. Also find Harriet's height and the length of the shadow if the height of the building is 52m.

19. Solve for x :

a) $\sin 3x = \frac{1}{2}$ b) $3 \tan x - 4 = 0$ c) $-2 \cos \frac{x}{2} + 1 = 0$

