



**2018 Year 10 math topic test: Quadratic equations** © itute 2018

Q1 Solve each of the following equations for the **exact** value/s of  $x$ .

a.  $x^2 - 8 = 8$

1 mark

b.  $-\frac{2x}{3}\left(x - \frac{3}{2}\right) = 0$

2 marks

c.  $\frac{1}{3}(3 - x)^2 = 3$

2 marks

d.  $4x - 3x^2 = 1$

2 marks

e.  $(1 - 3x)^2 + 11(1 - 3x) = 12$

3 marks

f.  $-2x + x^2 - 7 = 0$

3 marks



g.  $3\left(\frac{1}{2} - x\right)\left(x + \frac{1}{3}\right) = 2\left(x + \frac{1}{3}\right)\left(x - \frac{1}{2}\right)$

3 marks

h.  $\frac{(x-10)(x+12)}{24+2x} = 1$

3 marks

i.  $\sqrt{(3-x)^2} = 9$

2 marks

Q2 Consider the quadratic equation  $4x^2 + ax + b^2 = 0$  where  $a > 0$  and  $b > 0$ .

a. Find the number of solutions to the equation for  $x$  if  $a = 6$  and  $b = 1$ .

2 marks

b. Find the number of solutions to the equation for  $x$  if  $\frac{b}{a} > \frac{1}{4}$ .

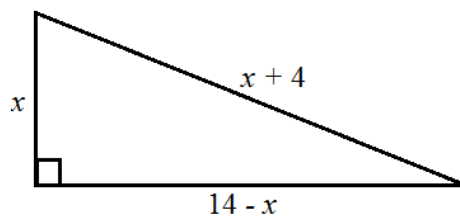
4 marks



Q3 The difference between two numbers is 22. The smaller number is  $(n - 9)$ .

- a. Write down the larger number in terms of  $n$ . 1 mark
- b. The product of the two numbers is  $-40$ , set up an equation in finding the value/s of  $n$ . 1 mark
- c. Find the value/s of  $n$ . 3 marks
- d. If the product of the two numbers is an odd integer, then 1 mark
- A.  $n$  is an odd integer      B.  $n$  is an even integer      C.  $n$  can be odd or even  
 (Circle the correct answer)
- e. Give an explanation for your answer in part d. 2 marks

Q4 In the following diagram the length of one side of the right-angled triangle is  $x$  cm. The other measurements are as shown.



- a. Use Pythagoras Theorem to set up an equation in  $x$ . 2 marks
- b. Find the possible value/s of  $x$ . 4 marks



Q5 Consider the simultaneous equations  $y = x^2 + 1$  and  $y = 3 - (m - x)^2$  where  $m$  is a real constant to be determined.

a. Eliminate  $y$  from the two equations to obtain a quadratic equation in  $x$ .

Express your answer in the form  $ax^2 + bx + c = 0$ .

3 marks

b. Find the **exact** value/s of  $m$  so that the simultaneous equations have only one solution.

3 marks

c. Find the value/s of  $m$  so that the simultaneous equations have two solutions.

3 marks