Test: Quadratic Equations

$x = \frac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

...Put your Answers in the BOXES...

1. Solve the following for $x$ using the method of your choice. Answers should be given rounded to 2 decimal places where applicable. (6 marks)
   (Graphing calculator can be used only once and you must sketch the graphing window)

(a) $(x + 2)^2 = 18$

(b) $3x^2 + 4x - 2 = 0$

(c) $16x^2 - 24x + 9 = 0$
2. Determine the **nature of the roots** (i.e. 2 different, 2 equal or no real roots) of the following quadratic equations: 
   (6 marks)
   (a) \(4x^2 - 12x + 9 = 0\)

   (b) \(2x^2 - 5x = -6\)

3. For what value(s) of \(k\) does the equation:
   (2 marks)
   (a) \(4x^2 - 5x + k = 0\) have two different real roots

   (b) \(5x^2 - 2kx + 5 = 0\) have no real roots
4. Solve \(2x^2 + 5x = 3\) by factoring. 

(2 marks)

5. The path of a soccer ball can be modelled by the function:

\[ h(d) = -0.08d^2 + 0.7d + 0.4 \], where \(h\) is the height of the ball and \(d\) is the horizontal distance from the kicker, both in metres.

(a) What are the zeros of the function? 

(2 marks)

(b) What do the zeros represent in relation to the ball? 

(1 mark)

(c) How far (to the nearest tenth of a metre) down the field did the ball travel before it hit the ground? 

(1 mark)
6. Solve the equation \(4x^2 - 4x - 1 = 0\) using the quadratic formula. Leave your answers as exact values in simplest form. \([3\text{ marks}]\)

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7. Lindsay wants to frame a Winnie the Pooh picture measuring 40 cm by 30 cm for the new baby’s room. Before framing, she places the picture on a rectangular white mat so that a uniform strip of the mat shows on all sides of the picture. If the area of the mat is 1.5 times the area of the picture, how wide is the strip of exposed mat showing on all sides of the picture to the nearest tenth of a centimeter? \([4\text{ marks}]\)

Let \(x\) = width of exposed mat