Year 10a Class Test. /44

1. Factorise the following:

a) $yx^2 + 2xy - x - 2$ 1

b) $25a^2 - 81g^2$ 2

c) $6f^2 + 11f + 3$ 2

2. Solve the following equations:

a) $\frac{-y}{5} = -9$ 1

b) $\frac{d}{3} + 1 = 7 - \frac{3d}{4}$ 3

c) $\frac{11k-5}{-3} = 2k - 7$ 3

3. Solve these equations simultaneously: 3

$$5p - 6n = 12$$

$$2p + 9n = 20$$

4. Solve by completing the square: 2

$$y^2 - 3y + 1 = 0$$

5. Solve $4^x - 5(2^x) + 4 = 0$ 2

6. Simplify the following surds:

a) $\sqrt{75} - 2\sqrt{32} - \sqrt{27}$ 2

b) $\sqrt{2}\ (\sqrt{8} + \sqrt{32})$ 2

c) $(3\sqrt{7} - 2\sqrt{5})^2$ 1

d) $\frac{4+3\sqrt{7}}{2\sqrt{5}-1}$ 3

7. Given ΔABC with vertices A(0, 8), B(3, 0) and C(-3, 0).
   a) Show this triangle is isosceles 2
   b) Find the length of the altitude from A 1
   c) Find the area of the triangle 1
   d) Find the equation of the line AC 2

8. The midpoint of (a, 3) and (-4, b) is (1, 2). Find values a & b. 3

9. Find the equation of a straight line that is perpendicular to the line 3

   $2y - x + 3 = 0$ and passes through the point (1, -1).

10. A rectangle has a length of x and a width of y. It's perimeter is 34cm and its area is $60cm^2$. Find x & y. 2

11. The sum of the squares of two consecutive numbers is 145. What are the numbers? 3

2a) $xy(x+2)-1(x+2)$

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

b) $(25a^2-81g^2)=(5a-9g)(5a+9g)$ 1

c) $6f^2+11f+3$ $\times 6$ $\quad 18$

$\frac{(6f+9)(6f+2)}{6}$

$\frac{3(2f+3)2(3f+1)}{6}$

$=(2f+3)(3f+1)$ 2

2a) $\frac{-y}{5}=-9$

$-y=-45$

$y=45$ 1

2b) $\frac{d}{3}+1=7-\frac{3d}{4}$

$\frac{d}{3}\overset{\times 4}{+}\frac{3d}{4}\overset{\times 3}{=}6$

$\frac{4d}{12}+\frac{9d}{12}=6$

$\frac{13d}{12}=6$ $\quad \frac{13d}{}=72$

$d=\frac{72}{13}$ 3

c) $\frac{11k-5}{-3}=(2k-7)$

1.

$11k-5=-3(2k-7)$

$11k-5=-6k+21$

$17k=26$

$k=\frac{26}{17}$ 3

3) $5p^{x^2} - 6n^{x^2} = 12 \times 2$

$2p + 9n = 20$
$\times 5 \quad +5 \quad +5$

$10p - 12n = 24$
$10p + 45n = 100$

$-57n = -76$

$n = \frac{76}{57}$

$2p + 9\left(\frac{76}{57}\right) = 20$

$2p + 12 = 20$

$2p = 8$

$p = 4$ 3

4) $y^2 - 3y + 1 = 0$

$y^2 - 3y = -1$

$y^2 - 3y + \frac{9}{4} = \frac{5}{4}$

$\left(y - \frac{3}{2}\right)^2 = \frac{5}{4}$

$y - \frac{3}{2} = \frac{\pm\sqrt{5}}{\pm 2}$ 2

surd form

$y = 2 \cdot 62 (2dp), 0 \cdot 38 (2dp)$

5) $4^x - 5(2^x) + 4 = 0$

let $2^x = U$

$\therefore (U^2) - 5(U) + 4 = 0$

$(U - 4)(U - 1) = 0$

$U = 4, 1$

$4 = 2^x$

$x = \frac{\log(4)}{\log(2)}$

$x = 2$

$2^x = 1$

$x = \frac{\log(1)}{\log(2)}$

$x = 0$ 2

6a) $\sqrt{25}\sqrt{3} - 2\sqrt{16}\sqrt{2} - \sqrt{9}\sqrt{3}$

$5\sqrt{3} - 8\sqrt{2} - 3\sqrt{3}$

$2\sqrt{3} - 8\sqrt{2}$ 2

b) $\sqrt{2}(\sqrt{8} + \sqrt{32})$

$\sqrt{16} + \sqrt{64} = 4 + 8 = 12$ 2

6c) $(3\sqrt{7}-2\sqrt{5})^2$ $(3\sqrt{7}-2\sqrt{5})(3\sqrt{7}-2\sqrt{5})$

$=(9\times7)-2($ $(9\times7)-6\sqrt{35}+6\sqrt{35}+4\sqrt{25}$

$63-12\sqrt{35}+4\times5$

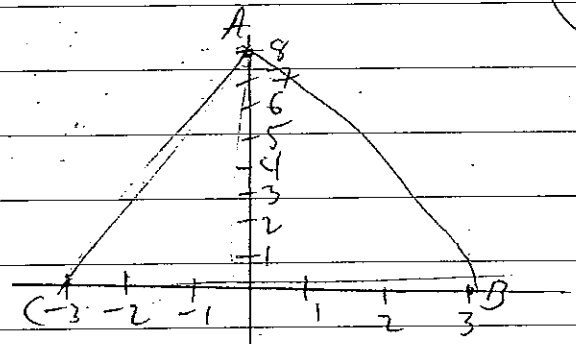
$63+20-12\sqrt{35}$

$83-12\sqrt{35}$ 1

d) $\dfrac{(4+3\sqrt{7})}{(2\sqrt{5}-1)} \times \dfrac{(2\sqrt{5}+1)}{(2\sqrt{5}+1)}$ $\dfrac{8\sqrt{5}+4+6\sqrt{35}+3\sqrt{7}}{(4\times5)-1}$

$\dfrac{8\sqrt{5}+4+6\sqrt{35}+3\sqrt{7}}{19}$ 3

7a)



$CB=\sqrt{(3-3)^2+(0-6)^2}$

$=\sqrt{9}$

$=3$

In $\triangle ABC$,

$AB=\sqrt{(3-0)^2+(0-8)^2}$

$=\sqrt{9+64}$

$AC=\sqrt{(-3-0)^2+(0-8)^2}$ $=\sqrt{73}$ 2

$(=\sqrt{7\cdot7})$ $\therefore$ Since $AB=AC$ and CB ...arises,

b) 8 1

c) $\frac{1}{2}(3)\times8$

$=12$ 1

d) $A=(0,8)$ $C=(-3,0)$

$\dfrac{y_2-y_1}{x_2-x_1}=\dfrac{y-y_1}{x-x_1}$

$\dfrac{(0-8)}{(-3-0)}=\dfrac{(y-8)}{(x-(-3))}$ $(-3)(y-8)=x(0-8)$

$-3y+24=-8x$

$-3y+24+8x=0$

(general form) 2

$-3y=-8x-24$

$y=\frac{8}{3}x+8$

y-int form

8) $\left(\dfrac{x_2+x_1}{2}\right),\left(\dfrac{y_2+y_1}{2}\right)=m.p$

$=(\frac{1}{2},2)$

$\dfrac{3+b}{2}=2$ $b=1$

$3+b=4$

$\dfrac{a+-4}{2}=\frac{1}{2}$ 3

$a-4=2$

$(a=6)$ 6

9) $2y - x + 3 = 0 \quad (1, -1)$

$\frac{2y}{2} = \frac{x-3}{2}$

$y = \frac{1}{2}x - \frac{3}{2}$

negative reciprocal of $\frac{1}{2}$ is (-2)

$\therefore y - y_1 = m(x - x_1)$

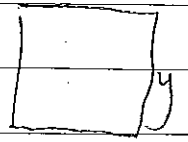
$y - (-1) = -2(x - 1)$

$y + 1 = -2x + 2$

$0 = -2x + 1 - y$

$0 = 2x - 1 + y$

$y = -2x + 1$ 3

10) 

$P = 34$

$A = 60$

$2x + 2y = 34$

$x \times y = 60$

$xy = 60$

$2x + 2y = 34$

$y = 12, 5$

$2x + 2(5) = 34 \quad 2x + 2(12) = 34$

$\frac{2x}{2} = \frac{24}{2} \quad 2x = 10$

$x = 5$

$x = 12$

$y = 12, 5$
$x = 5, 12$ 2

$12 \times 5 = 60$

$2(12) + 2(5) = 34$

vice versa

$x = \frac{60}{y}$

$2\left(\frac{60}{y}\right) + 2y = 34$

$\frac{120}{y} + 2y = 34$

$\frac{120}{y} = 34 - 2y$

$120 = 34y - 2y^2$

$-2y^2 + 34y - 120 = 0$

$\frac{-2y^2 + 34y - 120}{-1}$

$2y^2 - 34y + 120$

$\frac{(2y - 24)(2y - 10)}{2} = 0$

$\frac{2(y - 12)(2y - 10)}{2} = 0$

$(y - 12)(2y - 10) = 0$

$y - 12 = 0 \quad 2y - 10 = 0$

(1)

11) $(x)^2 + (x+1)^2 = 145$

~~$2x(+1) = 145$~~

~~$\frac{2x}{2} = \frac{144}{2}$~~ ~~$x = 72$~~

$x^2 + x^2 + 2x + 1$

$2x^2 + 2x + 1 = 145$

$2x^2 + 2x - 144 = 0$

$2x^2 + 2x - 288 = 0$

$\frac{(2x-16)(2x+18)}{2} = 0$

$\frac{x(x-8)(2x+18)}{x} = 0$

$x = 8$

$8^2 + (8+1)^2 = 145$

$64 + 9^2 = 145$

numbers are 8 and 9