

Section 2 – 5.3 (20 marks)**Attempt Questions 1 to 13.****Allow approximately 30 minutes for this section****Multiple Choice Questions**

1. $\sqrt{20}$ in its most simplified form is:

A. $5\sqrt{4}$

B. $4\sqrt{5}$

☒ C. $2\sqrt{5}$

D. $\sqrt{2 \times 10}$ ✓

2. Simplify fully:

$$2\sqrt{5} + 3\sqrt{45}$$

A. $5\sqrt{50}$

☒ B. $11\sqrt{5}$

C. $11\sqrt{50}$

D. $29\sqrt{5}$ ✓

3. Expand and simplify: $-2(x + 4y) - 3x(6 - 2x)$.

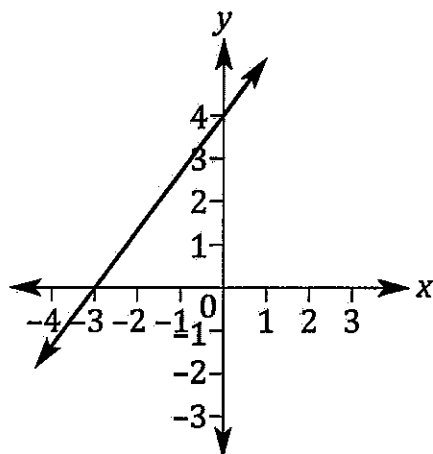
A. $6x^2 - 28xy$

B. $6x^2 - 16x - 8y$

☒ C. $6x^2 - 20x - 8y$

D. $20x - 8y - 6x^2$ ✓

4. The rule for the following linear relation is:



A. $y = \frac{3}{4}x + 4$

B. $y = \frac{-3}{4}x - 4$

C. $y = 4x - 4$

☒ D. $y = \frac{4}{3}x + 4$ ✓

5. The point of intersection of the 2 lines $y = ax$ and $x = -b$ is:

A. $(1, -b)$

B. $(-b, ax)$

C. (b, ax)

☒ D. $(-b, -ab)$ ✓

Short Answer Questions

Answer the questions in the spaces provided. Your responses should include relevant mathematical reasoning and/or calculations.

Marks **CANNOT** be awarded for poorly organised written work.

6. Expand and simplify: (1)

$$\begin{aligned}(7 - \sqrt{2})^2 \\&= 49 - 2 \times 7 \times \sqrt{2} + 2 \\&= 51 - 14\sqrt{2} \quad \checkmark\end{aligned}$$

7. Rationalise the denominator and fully simplify: (2)

$$\begin{aligned}\frac{4\sqrt{2} - \sqrt{3}}{\sqrt{3}} \times \frac{\sqrt{3}}{\sqrt{3}} \quad \checkmark \\&= \frac{4\sqrt{6} - 3}{3} \quad \checkmark\end{aligned}$$

8. Solve for x :

$$5^{x-3} = \frac{1}{25} \quad (2)$$

$$\begin{aligned}5^{x-3} &= 5^{-2} \quad \checkmark \\x-3 &= -2 \\x &= 1 \quad \checkmark\end{aligned}$$

9. If $a^b = x$ and $a^{3b} - 1 = 63$, find the value of x . (2)

$$(a^b)^3 - 1 = 63 \quad \checkmark$$

$$x^3 = 64$$

$$x = 4 \quad \checkmark$$

10. Solve the following inequality. (2)

$$5 - \frac{2x}{3} \geq 1$$

$$-\frac{2x}{3} \geq -4 \quad \checkmark$$

$$2x \leq 12$$

$$x \leq 6 \quad \checkmark$$

11. Determine the linear equation of the line that passes through the given points. (2)

$(4, 10), (-2, 1)$

$$m = \frac{1 - 10}{-2 - 4}$$

$$= \frac{-9}{-6}$$

$$= \frac{3}{2} \quad \checkmark$$

$$y = -\frac{3}{2}(x) + c \quad (-2, 1)$$

$$1 = -\frac{3}{2}(-2) + c$$

$$1 = 3 + c$$

$$4 = c$$

$$\therefore y = -\frac{3}{2}x + 4 \quad \checkmark$$

12. Find the equation of the line which is perpendicular to the line $3x - 5y - 7 = 0$ and which passes through the point $(2, -6)$. (2)

$$\begin{aligned}
 -5y &= -3x + 7 \\
 y &= +\frac{3}{5}x - \frac{7}{5} \\
 m &= +\frac{3}{5} \\
 m_{\perp} &= -\frac{5}{3} \quad \checkmark \\
 y &= -\frac{5}{3}x + c \quad (2, -6) \\
 -6 &= -\frac{5}{3}(2) + c \\
 +\frac{10}{3} &= c \\
 y &= \frac{5}{3}x + \frac{2}{3} \quad \checkmark
 \end{aligned}$$

13. Solve the following equations simultaneously, using a suitable method: (2)

$$\begin{aligned}
 2y + 5x &= 13 \\
 y - 3x &= 1
 \end{aligned}$$

$$\begin{aligned}
 y &= 3x + 1 \quad \text{--- (1)} \\
 2y + 5x &= 13 \quad \text{--- (2)} \\
 \text{①} \Rightarrow \text{②} \quad 2(3x + 1) + 5x &= 13 \\
 6x + 2 + 5x &= 13 \\
 11x &= 11 \\
 x &= 1 \quad \checkmark \\
 y &= 3(1) + 1 \\
 &= 4 \quad \checkmark
 \end{aligned}$$

END OF EXAM