Name: _____

TOPIC TEST 3
Algebra

- Time allowed: 45 minutes
- Part A: 20 multiple-choice questions (40 marks)
- Part B: 8 free-response questions (60 marks)

Part A

20 multiple-choice questions
2 marks each: 40 marks
Circle the correct answer.

1 Simplify $5x - 3y + 6y - x$.

A $5 + 3y$ **B** $4x - 9y$
C $6x + 9y$ **D** $4x + 3y$

2 If $a = -3$, evaluate $4a - 2$.

A -14 **B** -9
C -1 **D** 10

3 Simplify $\frac{5m}{2} + \frac{4m}{3}$.

A $\frac{9m^2}{5}$ **B** $\frac{9m}{5}$
C $\frac{23m}{6}$ **D** $\frac{3m}{2}$

4 Simplify $3ku \times 4ru$.

A $7kru$ **B** $7kru^2$
C $12kru^2$ **D** $12kru$

5 Expand $-2(3t - 4)$.

A $-5t + 8$ **B** $-5t - 6$
C $-6t + 8$ **D** $-6t - 6$

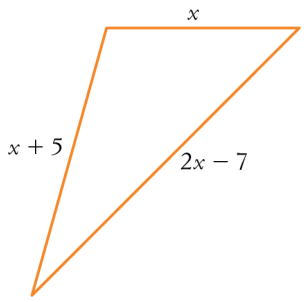
6 If p is an odd number, then the next *even* number is:

A $p + 1$ **B** $p + 2$
C $2p + 1$ **D** $3p$

7 Simplify $6a \div a$.

A $5a$ **B** 6
C $6a$ **D** a

8



The perimeter of this triangle is:

A $3x - 2$ **B** $3x + 12$
C $4x - 2$ **D** $4x + 2$

9 The sum of the angles, in degrees, in a shape with n sides is given by the formula $A = 180(n - 2)$. What is the sum of the angles in a hexagon (6 sides)?

A $720°$ **B** $270°$
C $1078°$ **D** $360°$

10 Which expression below means 'the number 4 less than y'?

A $y - 4$ **B** $4 - y$
C $\frac{y}{4}$ **D** $\frac{4}{y}$

11 Which one of these is *not* a common factor of $5ab^2$ and $10b^2$?

A $2a$ **B** b
C $5b$ **D** b^2

12 Simplify $\frac{6de^2}{3de}$.

A 2 **B** $2e$
C $3e$ **D** $\frac{2}{e}$

13 Simplify $\frac{2u}{5} \times \frac{u}{8}$.

A $\frac{u^2}{20}$ **B** $\frac{3u}{13}$

C $\frac{11u}{40}$ **D** $\frac{u^2}{40}$

14 Factorise $3a^2 + 24a$.

A $3(a^2 + 8)$ **B** $3a(a + 8)$

C $3(a^2 + 12)$ **D** $3a(a + 12)$

15 If $f = 3$ and $g = -1$, evaluate $f^2 + g^2$.

A 5 **B** 8

C 10 **D** 7

16 Expand and simplify $3(3d - 7) - 2(d + 4)$.

A $4d - 4$ **B** $7d + 13$

C $7d - 16$ **D** $7d - 29$

17 Simplify $\frac{4xy \times 15x}{6y}$.

A $10xy$ **B** $10x$

C $10x^2$ **D** $10x^2y^2$

18 Simplify $\frac{r}{4} \div \frac{r}{2}$.

A $\frac{r^2}{8}$ **B** $\frac{1}{8}$

C $\frac{1}{2}$ **D** 2

19 Expand $(d + 5)(d - 3)$.

A $d^2 + 8d - 15$ **B** $d^2 + 2d - 15$

C $d^2 + 2d + 2$ **D** $d^2 + 2d + 15$

20 Which expression describes the change (in dollars) from \$100 after buying n books at \$6 each?

A $6(100 - n)$ **B** $\frac{100 - n}{6}$

C $6n - 100$ **D** $100 - 6n$

Part B

8 free-response questions
60 marks
Show your working where appropriate.

21 (8 marks) Simplify each of the following expressions.

a $2u - 3 - u - 3$

b $4m - 5m + 7d - 2m$

c $-5k \times 4$

d $-2rt \times (-9t)$

22 (4 marks)

Write a simplified algebraic expression for:

a the perimeter of this rectangle

b the rectangle's area.

23 (10 marks) If $a = 8$ and $b = -5$, evaluate:

a $2a + b$

b $3a^2$

c $\frac{10 - b}{5}$

d $\frac{1}{2}ab$

e $\sqrt{2(a - 2b)}$

24 (6 marks) Write an expression for:

a Liz's age in t years if she is 15 this year

b the number of days in k weeks

c increasing the product of p and 5 by 7.

25 (8 marks) Simplify:

a $(4x)^2$

b $\frac{-14u}{2u}$

c $\frac{18rt^2}{4t}$

d $\frac{30d^2e}{45de^2}$

26 (10 marks) Expand and simplify each of the following expressions.

a $c\,(3c + 5)$

b $-2(10x - 4)$

c $2(k + 4) + 3(k - 1)$

d $(a + 2)(a + 8)$

e $(2c - 3)(c - 7)$

27 (8 marks) Factorise each of these expressions.

a $8b + 28$

_____

b $18a - 3$

_____

c $4mn - 10n^2$

_____

d $-3ab - 21$

_____

28 (6 marks) Simplify each of these expressions.

a $\frac{2m}{3} - \frac{m}{5}$

_____

_____

b $\frac{5x^2}{2y} \times \frac{4}{15x}$

_____

_____

c $\frac{3de}{10} \div \frac{6e}{2}$

_____

_____

This is the end of the test.
Use the rest of the page for extra working space.

Answers

1 D **2** A **3** C **4** C **5** C
6 A **7** B **8** C **9** A **10** A
11 A **12** B **13** A **14** B **15** C
16 D **17** C **18** C **19** B **20** D

21 **a** $u - 6$ **b** $-3m + 7d$ **c** $-20kp$ **d** $18rt^2$

22 **a** $4x + 14$ **b** $x^2 + 7x$

23 **a** 11 **b** 192 **c** 3 **d** -20 **e** 6

24 **a** $t + 15$ **b** $7k$ **c** $5p + 7$

25 **a** $16x^2$ **b** -7 **c** $\frac{9rt}{2}$ **d** $\frac{2d}{3e}$

26 **a** $3c^2 + 5c$ **b** $-20x + 8$ **c** $5k + 5$
d $a^2 + 10a + 16$ **e** $2c^2 - 17c + 21$

27 **a** $4(2b + 7)$ **b** $3(6a - 1)$ **c** $2n(2m - 5n)$ **d** $-3(ab + 7)$

28 **a** $\frac{7m}{15}$ **b** $\frac{2x}{3y}$ **c** $\frac{d}{10}$