MATH 1314

Final Exam Review

30 Multiple Choice Questions (Equally Weighted)

1. Find the slope of the line that passes through the points (4,6) and (−2,−4).

x_1, y_1

x_2, y_2

$$m = \frac{y_2 - y_1}{x_2 - x_1} = \frac{-4 - 6}{-2 - 4} = \frac{-10}{-6} = \frac{5}{3}$$

2. Find the x and y intercepts $2x + 8y + 2 = 0$.

x-int ($y=0$)

$2x + 8(0) + 2 = 0$

$2x + 2 = 0$

$-2 \quad -2$

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

$x = -1$

$(-1, 0)$

y-int: ($x=0$)

$2(0) + 8y + 2 = 0$

$8y + 2 = 0$

$-2 \quad -2$

$\frac{8y}{8} = \frac{-2}{8}$

$y = \frac{-1}{4}$

$(0, -\frac{1}{4})$

3. Solve for x: $\frac{2}{3}x = \frac{4}{5}$

$$\frac{2x}{3} = \frac{4}{5}$$

$$\frac{10x}{10} = \frac{12}{10}$$

$$x = \frac{6}{5}$$

4. Solve for x: $\frac{1}{2}(x+1)-\frac{1}{3}(x-2)=\frac{4}{1}$ CD: 6

$\frac{3}{3}\cdot\frac{1}{2}(x+1)-\frac{2}{2}\cdot\frac{1}{3}(x-2)=\frac{4}{1}\cdot\frac{6}{6}$

$\frac{3}{6}(x+1)-\frac{2}{6}(x-2)=\frac{24}{6}$

$3x+3-2x+4=24$

$x+7=24$

$-7 \quad -7$

$\boxed{x=17}$

5. The perimeter of a rectangle is 70 m. If the length 4 times its width. Find the length of this rectangle.

$P = 70$ $\quad \ell = 4 \cdot w$

$2\ell + 2w = 70$

$2(4w) + 2w = 70$

$8w + 2w = 70$

$\frac{10w}{10} = \frac{70}{10}$

$w = 7$

$\ell = 4 \cdot w$

$\ell = 4 \cdot 7 = \boxed{28}$

6. Find three consecutive integers whose sum is 336.

First Integer: x

Second Integer: $x+1$

Third Integer: $x+2$

$$x+(x+1)+(x+2)=336$$

$$3x+3=336$$

$$-3 \quad -3$$

$$\frac{3x}{3}=\frac{333}{3}$$

$$x=111$$

First: $x=111$

Second: $x+1=112$

Third: $x+2=113$

7. Solve by factoring: $2x^2 + 5x + 3 = 0$

Leading coefficient $\neq 1$

$(2)(3) = 6$

$2, 3$ (Multiply to 6)

(Add to 5: Middle Term)

$(2x^2 + 2x) + (3x + 3) = 0$

$2x(x+1) + 3(x+1) = 0$

$(x+1)(2x+3) = 0$

$x+1=0$

$-1 \quad -1$

$x = -1$

$2x+3=0$

$-3 \quad -3$

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

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

$\left\{-\frac{3}{2}, -1\right\}$

8. Solve by factoring: $x^2 + 36 = 0$

$$x^2 + 36 = 0$$
$$-36 \quad -36$$
$$\sqrt{x^2} = \sqrt{-36}$$
$$\boxed{x = \pm 6i}$$

9. Simplify: $(2i - 1) - (1 - i)$

$2i - 1 - 1 + i$

$3i - 2$

$-2 + 3i$

10. **Simplify:** $3i(2-3i)$

$6i - 9i^2$ $(i^2 = -1)$

$6i - 9(-1)$

$6i + 9$

$9 + 6i$

11. **Simplify:** $\frac{(2+3i)}{(4+i)} \cdot \frac{(4-i)}{(4-i)} = \frac{8-2i+12i-3i^2}{16-4i+4i-i^2}$

$i^2 \to +3$

$-i^2 \to +1$

conjugate (change sign of imaginary term)

$= \frac{11+10i}{17} = \boxed{\frac{11}{17} + \frac{10}{17}i}$

12.Simplify: $\frac{1}{(3-i)} \cdot \frac{3+i}{(3+i)} = \frac{3+i}{9+3i-3i-i^2}$

$+1$

$= \frac{3+i}{10} = \frac{3}{10} + \frac{1}{10}i$

13. Solve for x: $-2 \le \frac{(3x+2)}{3} < 2$

$3(-2) \le \frac{(3x+2)}{3} \cdot 3 < (2)3$

$-6 \le 3x+2 < 6$

$-2 \quad -2 \quad -2$

$-8 \le 3x < 4$

$\frac{-8}{3} \le \frac{3x}{3} < \frac{4}{3}$

$-8/3 \le x < 4/3$

$[-8/3, 4/3)$

↑ Endpoint included

↑ Endpoint not included

14. Solve of x: $5 + 2|x + 5| = 7$

$-5 \quad -5$

$\frac{2|x+5|}{2} = \frac{2}{2}$

$|x+5| = 1$

$x+5 = 1$ $\qquad$ $x+5 = -1$

$-5 \quad -5$ $\qquad$ $-5 \quad -5$

$x = -4$ $\qquad$ $x = -6$

$\{-6, -4\}$

15. Solve for x: $-2|x-1| \le -6$

$\frac{-2}{} \quad \frac{-2}{}$

$|x-1| \ge 3$

$|Abs| > Number$

$Abs < -Number$ or $Abs > +Number$

$x-1 \le -3$ or $x-1 \ge 3$

$+1 \quad +1 \qquad +1 \quad +1$

$x \le -2$ or $x \ge 4$

$(-\infty, -2] \cup [4, \infty)$

special case:

$|Abs| \ge Neg$

$(-\infty, \infty)$

16. Solve for x: $|3x - 4| < 5$

$-5 < 3x - 4 < 5$

$+4 \quad +4 \quad +4$

$-1 < 3x < 9$

$\frac{-1}{3} < x < 3$

$\left(\frac{-1}{3}, 3\right)$

$|Abs| < Number$

$-Number < Abs < +Number$

special case:

$|Abs| \leq Neg$

No Solution

17. Find the domain: $f(x) = \dfrac{x+2}{x-1}$

$x - 1 \neq 0$

$+1 \quad +1$

$x \neq 1$

$(-\infty, 1) \cup (1, \infty)$

18. Find the domain: $f(x) = \sqrt{3x + 9}$

$3x + 9 \geq 0$

$-9 \quad -9$

$\frac{3x}{3} \geq \frac{-9}{3}$

$x \geq -3$

$[-3, \infty)$